JUNE 13, 1983

CHEMICAL & ENGINEERING NEWS

Facts & Figures
for the chemical industry
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CHEMICAL & ENGINEERING
NEWS

Volume 61, Number 24
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JUNE 13, 1983

News of the Week

■ **New photochemical process that uses a laser may be useful in medicine and dentistry.** **Page 4**

■ **NRC committee recommends developing policy for transporting hazardous materials.** **Page 5**

■ **Chemistry as separate high school subject may have to be dropped to make way for more biology and physics, study concludes.** **Page 5**

■ **Polypeptide isolated from rat brains is linked to benzodiazepine receptors.** **Page 6**

■ **Transfer of biotechnology abroad can do without stiffer controls, study group postulates.** **Page 6**

Business

Aspartame's high price tag impedes extensive use; production of amino acid precursors is one of several hindrances. **Page 8**

Government

Technology assessment by governments viewed as an ongoing process with consequences for society, OECD study shows. **Page 13**

Science

Alternative study to Global 2000 Report reverses claims for future trends; economists and others see improvement. **Page 18**

Conductive polymer's colors, indicative of various oxidation states, may be useful as basis in display devices. **Page 21**

Books

Scientists who try to stretch the facts, and their motivations for doing so, are examined in "Betrayers of the Truth" by William Broad and Nicholas Wade. **Page 68**

Meetings

Washington, D.C., will host the ACS annual meeting; 516 technical sessions will be offered, along with special events, awards, and a variety of social activities. **Page 73**

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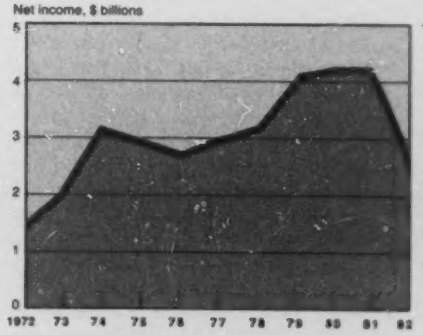


Facts & Figures

Lean years follow relatively prosperous ones for the chemical industry, as revealed in C&EN's latest annual compilation of statistics. **Page 28**

Facts & Figures
for the chemical industry

It has been three lean years in a row for the U.S. chemical industry, hard on the heels of four relatively fat ones. And in many ways, last year was the leanest of the three. Industry executives have been practically unanimous in viewing the year as probably the most problem wracked within memory.

With demand from some of the industry's most important customers in a severe slump, chemical companies were forced to cut back their operations drastically. Production of chemicals and synthetic materials, which had largely recovered from the sharp but relatively brief recession of 1980, began to fall again during the second half of 1981, hit bottom last summer, but remained depressed throughout the year. For 1982 as a whole, consequently, output averaged 14% lower than in 1981 and 16% under the peak year of 1979. Particularly hard hit were basic organic chemicals (down 19% last year) and man-made fibers (down 20%); fiber output in 1982 was 25% less than in 1979.

Nor was depressed output solely a U.S. phenomenon. Across the world, chemical operations were in the doldrums—or worse—as economic problems gripped both industrialized and developing nations.

In the U.S. at least, 1983 has brought some long-awaited signs of recovery. The rebound has been moderate so far, to be sure, and plants continue to operate at unsatisfactory levels well below those of early 1981, let alone 1979. Nevertheless, nearly everyone in the industry is convinced that the corner has been turned and that 1983 will register a marked improvement over last year.

On the following pages, C&EN's annual Facts & Figures issue presents the statistics that measure the chemical industry's recent performance. It brings together data from a diverse number of sources, including government agencies, trade associations, international organizations, and individual chemical companies. These data have been used, in addition, to develop an array of other statistics that indicate growth rates, provide analytical comparisons, and otherwise interpret the industry's record.

Facts & Figures at a glance

Section One: Production
Output of almost all chemicals and related products slumped during 1982. Production of such bellwether inorganics as sulfuric acid, chlorine and caustic soda, and ammonia, for example, had not been so low in nearly a decade or more. Olefin output was at the lowest level since 1976. Man-made fibers were more depressed than at any time since 1975. Plastics held up better than other major segments of the industry; nevertheless, production of thermoplastics last year was slightly less than in 1978 and 11% below 1979's peak. **Page 28**

Section Two: Finance
Sales of major chemical companies fell last year for the first time since 1975, largely because demand dried up but also because prices for industrial chemicals and plastics declined as well. Profits, meanwhile, were under heavy pressure, collapsing to the lowest level in nine years. Poor profitability and stagnant markets have led the industry to slash its outlays for new plant and equipment. But R&D budgets continue to rise, albeit at a more moderate rate than during the past few years. **Page 35**

Section Three: Efficiency
Productivity slumped in the chemical industry last year, driving unit labor costs up sharply as a result. One reason probably was the very low level of capacity utilization, well below that of the preceding year, throughout 1982. **Page 49**

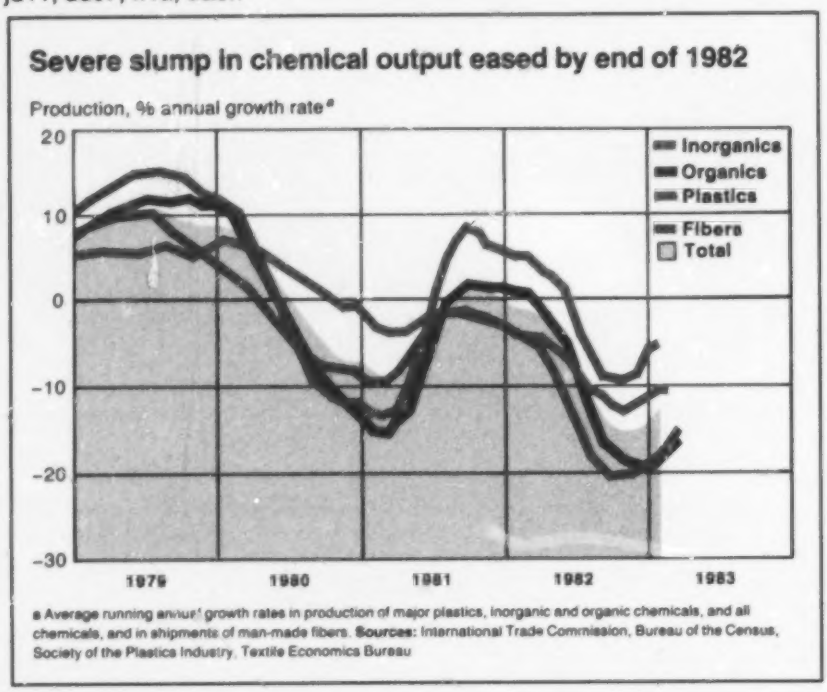
Section Four: Employment
The chemical industry's workforce declined steadily all through 1982, hitting bottom by year's end at the lowest level since late 1976. Most major companies cut down on the numbers of workers on their rolls, some to levels lower than their employment 10 years ago. **Page 52**

Section Five: Foreign trade
Worldwide recession caused world trade in chemicals to drop 11% in dollar volume, an unprecedented second decline in a row. For the second consecutive year, too, the favorable trade balance long enjoyed by U.S. chemical producers narrowed. Weak overseas markets and a stronger U.S. dollar resulted in a 6% drop in U.S. exports, and imports were practically unchanged from the year before. Even so, the U.S. managed to hang onto its overall share of the world chemical market. **Page 54**

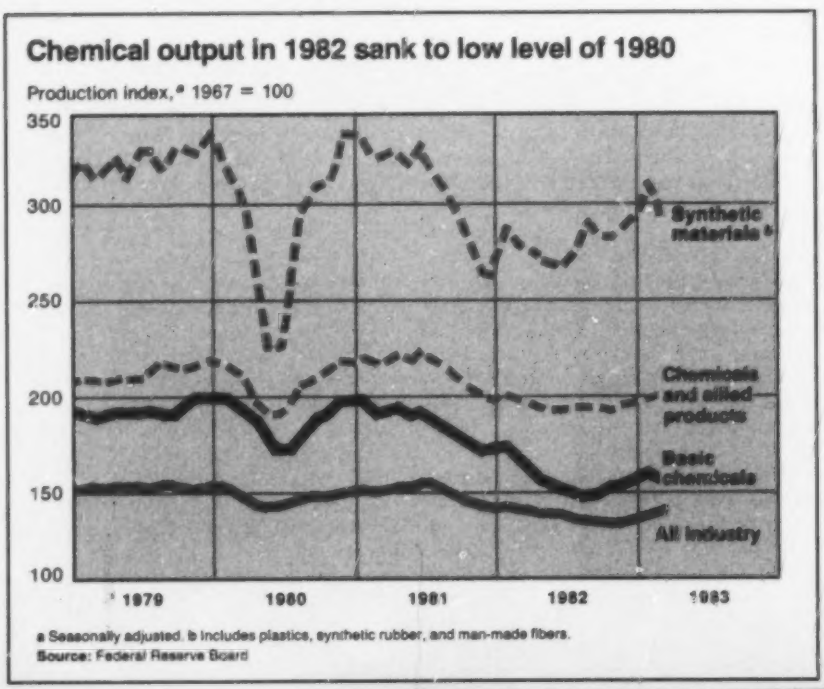
Section Six: Foreign chemical industries
Business was poor for chemical producers just about everywhere abroad last year. Production stumbled in most of the countries of Western Europe, with the industry in West Germany being hardest hit. Operations similarly stagnated in Japan, with petrochemicals particularly racked with problems. In Eastern Europe, growth was slow and failed to match official targets. In Canada, chemical producers, hit by reduced demand in both domestic and overseas markets and by high feedstock costs, saw their earnings dwindle. And in Mexico, output dropped after several years of rapid growth. **Page 56**

Output down for chemicals, related products

jd11, udc7, ff1a, c&en



a Average running annual growth rates in production of major plastics, inorganic and organic chemicals, and all chemicals, and in shipments of man-made fibers. **Sources:** International Trade Commission, Bureau of the Census, Society of the Plastics Industry, Textile Economics Bureau



a Seasonally adjusted. b Includes plastics, synthetic rubber, and man-made fibers.
Source: Federal Reserve Board

Output of U.S. chemical plants dropped in 1982 to the lowest levels since the recession of 1980. However, unlike the earlier steep but short-lived slump, output remained depressed throughout the year. Not until year-end was there any sign of recovery, and for 1982 as a whole production of chemicals and allied products was 9% less than in 1981.

Although production was off throughout the chemical industry, basic chemicals were hit hardest. Output of organic chemicals was down almost 20% in 1982 and inorganics and fertilizer materials fared almost as badly.

Among synthetic materials, production of man-made fibers sank 20% from the levels of 1981. The largest-volume fiber, polyester, was off 24%, dragging down the entire sector. Olefin fibers were the top performers, with only an 8% production decline.

After a small gain in 1981, output of plastics returned to the depressed levels of 1980. Only high-density polyethylene showed an increase in production. Low-density polyethylene didn't do too badly, with only a 2% drop. But other large-volume thermoplastic and thermosetting resins showed substantial declines.

The bright spot among chemical products was the drug industry, where production managed to hold its own at 1981 levels. And soaps and toiletries were off only 3%. In contrast, paints were down 9%, the second year of decline in a row. Agricultural chemicals production sank 14% after nine years of healthy growth.

Inorganic chemicals used in fertilizers—like ammonia, phosphoric acid, and sulfuric acid—all plummeted from output levels that were already lower than those of 1980. The poor performance reflects a sharp drop in both exports and U.S. consumption of fertilizer in 1982.

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TOP 50 CHEMICALS: Last year's sharp drop sank output beneath 1977's level

Rank 1982	Rank 1981[a]		Production: Billions of lb 1982	Billions of lb 1981	Common units[b] 1982	Common units[b] 1981	Average annual growth 1981–82	1980–81	1977–82	1972–82
1	1	Sulfuric acid	64.61	81.35	32,304 tt	40,675 tt	−20.6%	−8.1%	−3.4%	0.4%
2	5	Nitrogen	35.07	35.51	484 bcf	490 bcf	−1.2	2.3	7.9	9.6
3	2	Ammonia	30.98	38.08	15,488 tt	19,036 tt	−18.6	0.0	−2.5	0.2
4	4	Oxygen	29.66	35.68	358 bcf	431 bcf	−17.0	0.0	−1.9	0.1
5	3	Lime[c]	28.40	37.78	14,202 tt	18,890 tt	−24.8	6.8	−5.6	−3.0
6	6	Ethylene	24.68	29.42	24,683 mp	29,418 mp	−16.2	2.6	−0.6	1.7
7	8	Sodium hydroxide	18.28	20.83	9,141 tt	10,414 tt	−12.2	−10.4	−3.5	−1.1
8	7	Chlorine	18.27	21.12	9,136 tt	10,560 tt	−13.5	−7.5	−2.9	−0.8
9	9	Phosphoric acid	17.05	19.83	8,523 tt	9,914 tt	−14.0	−9.4	−1.0	2.4
10	12	Sodium carbonate[d]	15.79	16.56	7,896 tt	8,281 tt	−4.7	0.1	−0.5	0.6
11	10	Nitric acid	15.22	18.08	7,608 tt	9,039 tt	−15.7	3.5	−0.9	−0.5
12	11	Ammonium nitrate[e]	14.66	17.58	7,331 tt	8,791 tt	−16.6	−3.7	0.4	0.7
13	14	Propylene	12.29	13.48	12,290 mp	13,482 mp	−8.8	−1.4	−1.6	3.8
14	13	Urea[f]	11.64	16.21	5,918 tt	8,103 tt	−27.0	3.5	5.9	5.6
15	15	Ethylene dichloride	9.99	9.97	9,985 mp	9,974 mp	0.2	−10.2	−1.9	2.5
16	16	Benzene	7.90	9.63	1,073 mg	1,308 mg	−18.0	−35.0	−6.9	−1.5
17	24	Toluene[g]	7.67	6.18	1,057 mg	852 mg	24.1	−16.2	−0.2	1.4
18	18	Carbon dioxide[h]	7.38	7.96	3,688 tt	3,982 tt	−7.4	7.0	5.5	8.6
19	17	Methanol	7.26	8.58	7,265 mp	8,577 mp	−15.5	19.9	2.3	1.8
20	19	Ethylbenzene	6.67	7.81	6,674 mp	7,812 mp	−14.6	2.2	−4.3	1.6
21	20	Vinyl chloride	6.50	6.87	6,495 mp	6,874 mp	−5.4	6.3	1.6	2.5
22	21	Styrene	5.93	6.68	5,928 mp	6,680 mp	−11.3	−2.6	−2.9	−0.1
23	22	Xylene	5.29	6.35	735 mg	882 mg	−16.7	−3.0	−2.6	−0.1
24	26	Ethylene oxide	5.00	5.11	5,000 mp	5,109 mp	−2.1	−2.1	2.7	2.4
25	23	Terephthalic acid[i]	4.97	6.23	4,974 mp	6,234 mp	−20.2	3.0	−1.7	5.3
26	27	Hydrochloric acid	4.97	5.00	2,483 tt	2,501 tt	−0.7	−13.6	−1.8	0.6
27	25	Formaldehyde[j]	4.69	5.72	4,691 mp	5,721 mp	−18.2	3.0	−5.0	−1.9
28	30	Ethylene glycol	4.30	4.14	4,295 mp	4,142 mp	3.7	−5.6	3.2	1.3
29	29	Ammonium sulfate	3.57	4.22	1,785 tt	2,111 tt	−15.4	−1.2	−3.9	−0.4
30	28	*p*-Xylene	2.93	4.53	2,926 mp	4,532 mp	−35.4	6.9	−1.6	2.8
31	32	Acetic acid	2.75	3.07	2,751 mp	3,074 mp	−10.4	3.3	1.4	2.1
32	31	Cumene	2.68	3.31	2,678 mp	3,309 mp	−18.7	−4.3	0.3	1.6
33	35	Aluminum sulfate	2.37	2.59	1,186 tt	1,294 tt	−8.3	0.6	−5.5	0.0
34	34	Carbon black	2.29	2.73	2,290 mp	2,730 mp	−16.1	7.2	−7.2	−3.2
35	36	Phenol[k]	2.14	2.58	2,136 mp	2,578 mp	−17.4	0.4	−1.8	1.1
36	39	Acrylonitrile	2.04	2.00	2,041 mp	1,996 mp	2.3	9.1	4.4	6.2
37	40	Vinyl acetate	1.88	1.94	1,876 mp	1,936 mp	−3.1	0.7	3.4	4.5
38	33	Butadiene[l]	1.83	2.99	1,825 mp	2,986 mp	−38.8	6.7	−10.9	−6.4
39	37	Sodium sulfate[m]	1.79	2.33	893 tt	1,164 tt	−23.2	2.2	−5.7	−3.9
40	38	Acetone	1.76	2.14	1,757 mp	2,144 mp	−18.0	3.8	−4.6	0.1
41	41	Calcium chloride[n]	1.75	1.83	875 tt	917 tt	−4.4	13.1	−2.0	−2.9
42	43	Propylene oxide	1.48	1.73	1,477 mp	1,734 mp	−14.8	−1.9	−4.6	−0.3
43	44	Isopropyl alcohol	1.31	1.67	1,310 mp	1,669 mp	−22.2	−9.1	−7.2	−3.1
44	46	Sodium silicate	1.30	1.48	650 tt	738 tt	−12.2	−6.0	−3.1	−0.2
45	45	Titanium dioxide	1.27	1.52	635 tt	761 tt	−16.6	−3.3	−1.6	−0.9
46	42	Cyclohexane	1.27	1.82	1,272 mp	1,819 mp	−30.2	−7.4	−10.7	−5.7
47	47	Sodium tripolyphosphate	1.26	1.39	632 tt	696 tt	−9.2	−11.8	−2.5	−4.8
48	49	Adipic acid	1.20	1.21	1,197 mp	1,210 mp	−1.1	0.8	−4.9	−2.1
49	48	Acetic anhydride	1.06	1.25	1,061 mp	1,248 mp	−15.0	−15.0	−6.7	−3.9
50	50	Ethanol	1.02	1.32	1,022 mp	1,317 mp	−22.7	−9.2	−5.3	−5.8
		TOTAL ORGANICS IN TOP 50	**150.33**	**173.94**			**−13.6%**	**−1.2%**	**−1.3%**	**1.4%**
		TOTAL INORGANICS IN TOP 50	**315.94**	**373.45**			**−15.4%**	**−2.7%**	**−1.3%**	**0.5%**
		GRAND TOTAL OF TOP 50	**466.22**	**547.39**			**−14.8%**	**−2.2%**	**−1.3%**	**0.8%**

a Revised. b tt = thousands of tons, bcf = billions of cubic feet, mp = millions of pounds, mg = millions of gallons. c Except refractory dolomite. d Synthetic and natural. e Original solution. f 100% basis. g. All grades. h All forms. i Includes both acid and ester without double counting. j 37% by weight. k Synthetic only. l Rubber grade. m High and low purity. n Solid and liquid.
Sources: Bureau of the Census, Bureau of Mines, International Trade Commission, C&EN estimates

PRODUCTION: Dropped last year in all sections of chemical industry

Industrial production indexes, 1967 = 100	1982	1981	1980	1979	1978	1977	1976	1975	1974	1973	1972	Annual change 1981–82	Annual change 1972–82
Total index	138.6	151.0	147.0	152.5	146.1	138.2	130.5	117.8	129.3	129.8	119.7	−8%	1%
Manufacturing, total	137.6	150.4	146.7	153.6	146.8	138.4	130.3	116.3	129.4	129.8	118.9	−9	1
Nondurable manufacturing	156.2	164.8	161.2	164.0	156.9	150.5	141.8	126.4	134.6	133.8	126.5	−5	2
Chemicals and products	196.1	215.6	207.1	211.8	197.4	185.7	170.9	147.2	159.4	154.5	143.6	−9	3
Chemicals and synthetic materials	196.7	228.6	222.2	234.2	216.7	201.1	185.1	154.1	176.7	171.9	156.4	−14	2
Basic chemicals	157.1	186.8	187.4	192.0	181.9	171.8	161.8	135.9	153.3	147.7	137.7	−16	1
Alkalies and chlorine	99.2	114.7	121.4	132.3	119.7	119.2	119.0	106.5	125.6	123.8	120.2	−14	−2
Gases, coal tar, inorganic pigments	160.0	181.5	184.3	197.7	186.0	174.3	164.4	133.3	165.0	157.8	146.5	−12	1
Basic organic chemicals	192.9	236.7	231.6	233.3	221.2	204.7	189.8	155.3	177.9	170.0	155.3	−19	2
Inorganic chemicals, nec	109.9	125.5	132.4	134.9	129.3	128.5	124.3	112.9	112.6	110.8	107.8	−12	0
Acids and fertilizer materials	116.0	137.2	145.9	142.0	133.6	124.2	117.6	108.4	116.6	113.1	111.5	−15	0
Synthetic materials	277.4	313.7	293.3	320.1	287.6	260.8	232.5	191.0	224.4	221.1	194.7	−12	4
Plastics materials	403.6	429.3	386.5	420.1	366.5	320.3	280.1	213.1	258.5	243.3	217.4	−6	6
Synthetic rubber	84.9	103.3	103.2	130.5	127.5	124.5	118.7	101.2	129.7	135.6	126.9	−18	−4
Man-made fibers	204.2	254.4	250.3	270.8	250.9	236.8	214.3	191.2	214.4	220.1	189.1	−20	1
Chemical products	195.8	203.0	192.4	190.2	179.0	170.9	157.2	140.7	142.8	137.7	131.3	−4	4
Drugs and medicines	266.8	267.1	245.7	238.2	220.6	213.9	191.5	174.1	179.6	170.1	155.5	0	6
Soap and toiletries	171.5	177.0	170.8	171.6	163.8	155.0	143.0	127.7	128.1	129.0	130.3	−3	3
Paints	115.3	127.4	130.5	137.6	132.6	125.8	122.8	114.2	119.2	114.7	118.0	−9	0
Agricultural chemicals	208.7	241.4	230.5	221.6	211.8	201.1	185.4	163.9	144.6	127.0	108.9	−14	7
Petroleum products	121.8	129.7	132.9	143.9	145.2	142.6	133.5	124.1	124.7	128.5	122.1	−6	0
Rubber and plastics products	254.7	274.0	255.7	272.2	253.6	232.3	199.7	166.7	195.2	184.1	172.4	−7	4

nec = not elsewhere classified. **Source:** Federal Reserve Board

MINERALS: Fertilizer raw material production fell again in 1982

Thousands of tons	1982	1981	1980	1979	1978	1977	1976	1975	1974	1973	1972	Annual change 1981–82	Annual change 1972–82
Bromine, sold or used[a]	200[b]	189	189	249	223	217	230	204	216	209	193	6%	0%
Calcium chloride, production[c,d]	875	917	811	981	1,031	968	897	823	1,101	858	914[e]	−5	0
Iodine, consumption[f,g]	4.0[b]	4.4	4.4	4.4	4.0	4.3	3.6	3.1	3.8	3.5	3.4	−10	2
Imports[g]	2.8[b]	3.0	3.1	3.1	3.4	3.5	3.2	2.7	4.0	3.1	3.1	−7	−1
Lime, sold or used[h]	14,202[b]	18,890	19,037	20,983	20,484	19,987	20,257	19,159	21,645	21,132	20,332	−25	−4
Lithium, consumption[f,i]	2.9[b]	3.2	3.0	3.2	3.4	4.1	2.8	2.9	3.8	3.2	2.7	−10	1
Phosphate rock													
Marketable production	41,241	59,110	59,982	56,891	55,156	52,091	49,231	48,806	45,676	42,128	40,823	−30	0
Exports	10,849	11,458	15,737	15,827	14,187	14,584	10,398	12,270	13,895	13,873	14,272	−5	−3
Potash (K_2O equivalent)[j]													
Production	1,929[b]	2,377	2,468	2,453	2,484	2,457	2,400	2,501	2,552	2,604	2,659	−17	−3
Imports[k]	5,291[b]	5,287	5,481	5,693	5,189	5,076	4,594	3,797	4,325	3,587	2,961	0	6
Apparent consumption	6,614[b]	6,849	6,999	7,626	6,840	6,605	6,149	5,113	6,086	5,583	4,813	−3	3
Salt, total sold or used[l]	38,700[b]	38,915	40,396	45,820	42,896	43,439	44,218	41,057	46,565	43,939	45,051	−1	−2
Evaporated	5,418[b]	6,209	6,358	6,248	5,872	5,704	5,634	5,372	5,951	5,913	5,879	−13	−1
Rock	13,158[b]	11,871	11,806	14,891	14,688	14,958	15,668	14,283	14,835	12,347	14,434	11	−1
Salt in brine[m]	20,124[b]	20,835	22,231	24,681	22,336	22,777	22,917	21,401	25,779	25,680	24,737	−3	−2
Sodium carbonate, production[d]	8,000[b]	8,281	8,275	8,253	8,290	8,040	7,560	7,130	7,566	7,535	7,523	−3	1
Sulfur, production[n]	10,788	13,388	13,080	13,339	12,318	11,824	11,992	12,610	12,789	12,231	11,444	−19	−1
Apparent consumption[o]	11,088	14,093	15,056	15,145	13,889	12,850	12,060	11,875	12,115	11,463	11,036	−21	0
Frasch, production	4,641	6,997	7,044	7,007	6,226	6,520	7,016	8,077	8,849	8,518	8,165	−34	−6
Recovered elemental, production	4,855	4,695	4,490	4,486	4,478	3,995	3,514	3,326	2,948	2,706	2,184	3	8
Other, production	1,293	1,695	1,547	1,845	1,615	1,310	1,462	1,208	992	1,008	1,096	−24	2

a Elemental bromine sold as such or used in preparation of bromine compounds by primary producers. b Preliminary figure. c 75% $CaCl_2$ equivalent. d Natural and synthetic. e C&EN estimate. f Estimated apparent consumption. g Crude elemental iodine. h Includes Puerto Rican production. i Lithium content basis. j Includes muriate and sulfate of potash, potassium magnesium sulfate, and parent salts; excludes other chemical compounds containing potassium. k Includes nitrate of potash. l Total obtained by all recovery methods that was sold or used by domestic producers (figures differ slightly from U.S. production figures); figures except for 1982 include Puerto Rican production. m Sold or used as such. n Sulfur content basis. o Calculated from shipments plus imports minus exports (sulfur content basis). **Source:** Bureau of Mines

ORGANIC CHEMICALS: Steep declines marked output of most products in 1982

Millions of lb unless otherwise noted	Production											Annual change	
	1982[a]	1981	1980	1979	1978	1977	1976	1975	1974	1973	1972	1981–82	1972–82
Acetic acid, synthetic	2,751	2,705	2,977	3,265	2,776	2,570	2,463	2,197	2,584	2,429	2,235	2%	2%
Acetone	1,757	2,144	2,076	2,653	2,519	2,219	1,869	1,640	1,980	1,989	1,818	−18	0
Acrylonitrile	2,041	1,997	1,830	2,018	1,752	1,646	1,518	1,215	1,412	1,354	1,115	2	6
Aniline	557	634	659	690	606	584	544	407	551	458	410	−12	3
Benzene, mg[b,c]	1,073	1,339	1,585	1,673	1,488	1,457	1,425	1,024	1,488	1,453	1,252	−20	−2
Bisphenol A	479	555	530	576	471	455	449	293	370	320	255	−14	6
1,3-Butadiene[d]	1,826	2,986	2,799	3,583	3,515	3,259	3,507	2,597	3,682	3,644	3,527	−39	−6
Butanol	706	809	790	766	756	660	625	490	558	619	590	−13	2
Caprolactam	797	928	905[e]	945	919	867	780	713	668	656	640	−14	2
Carbon disulfide	na	388	377	448	476	505	508	479	782	777	758	na	na
Carbon tetrachloride	588	726	710	714	737	809	857	906	1,163	1,047	997	−19	−5
Cumene	2,678	3,309	3,459	3,917	3,380	2,644	2,716	2,003	2,906	2,665	2,293	−19	2
Cyclohexane	1,272	1,820	1,964	2,425	2,332	2,265	2,187	1,734	2,352	2,123	2,298	−30	−6
Diisodecyl phthalate	108	140	122	175	171	161	143	106	147	171	153	−23	−3
Dodecylbenzene[f]	484	535	563[e]	627	526	526	529	495	533	498	524	−10	−1
Ethanol, synthetic	1,028	1,317	1,451	1,408	1,267	1,339	1,496	1,429	1,618	1,962	1,851	−22	−6
Ethanolamines[g]	403	429	376	420	362	308	286	258	307	293	284	−6	4
Ethyl chloride	339	324	396	582	540	612	669	575	662	660	576	5	−5
Ethylbenzene	6,674	7,813	7,642	8,448	8,385	8,312	5,770	4,822	6,048	5,688	5,676	−15	2
Ethylene	24,683	29,418	28,667	29,904	25,955	25,172	22,475	20,499	23,891	22,329	20,852	−16	2
Ethylene dichloride	9,985	9,974	11,108	11,794	11,001	10,997	8,042	7,977	9,165[h]	9,293[h]	7,809	0	2
Ethylene glycol	4,295	4,143	4,386	4,729	3,904	3,675	3,335	3,809	3,341	3,278	3,761	4	1
Ethylene oxide	5,000	4,937	5,220	5,665	5,012	4,364	4,184	4,467	4,200[i]	4,167	3,962	0	2
2-Ethylhexanol	321	389	367	318	420	493	450	387	395	402	526	−17	−5
Formaldehyde, 37%[j]	4,691	5,721	5,555	5,971	6,381	6,046	5,449	4,558	5,764	6,424	5,652	−20	−2
Isopropyl alcohol	1,310	1,669	1,836	1,900	1,730	1,888	1,936	1,521	1,939	1,835	1,790	−22	−3
Maleic anhydride	259	293	304	323	341	294	264	216	290	282	274	−12	−1
Methanol, synthetic	7,265	8,577	7,153	7,367	6,443	6,453	6,242	5,176	6,878	7,064	6,472	−15	1
Methyl chloride	370	405	362	463	454	476	378	366	493[h]	544[h]	454	−9	−2
Methyl ethyl ketone	462	611	587	656	661	512	428	425	506	541	509	−24	−1
Methyl chloroform	586	614	692	716	644	635	631	459	592	548	441	−5	3
Methylene chloride	524	592	564	633	570	478	538	497	609	520	471	−11	1
Perchloroethylene	585	691	765	773	725	614	669	679	734	706	734	−15	−2
Phenol, synthetic[k]	2,136	2,578	2,568	2,981	2,682	2,338	2,121	1,746	2,298	2,241	2,052	−17	0
Phthalic anhydride	691	870	818	1,013	978	926	902	702	977	1,023	933	−21	−3
Propylene[c]	12,290	13,482	13,676[l]	14,198[l]	13,014[l]	13,328[l]	10,030[l]	8,709[l]	10,475[m]	9,884[m]	8,472[m]	−9	4
Propylene glycol	403	473	488	610	547	489	517	391	510	502	563	−15	−3
Propylene oxide	na	na	1,767	2,249	2,047	1,866	1,823	1,524	1,756	1,753	1,520	na	na
Styrene, monomer	5,928	6,679	6,856	7,484	7,186	6,867	6,301	4,673	5,956	5,975	5,941	−11	0
Terephthalic acid, dimethyl ester[n]	4,974	6,235	6,054	6,159	5,954	5,410	5,051	4,614	4,262	2,564[o]	4,405[p]	−39	1
Toluene, mg[b,c]	1,057	856	1,017	1,010	1,054	1,018	999	705	922	958	916	23	1
Vinyl acetate	1,876	1,936	1,922	1,982	1,692	1,586	1,481	1,290	1,403	1,503	1,211	−3	4
Vinyl chloride	6,495	6,874	6,466	6,389	6,941	5,986	5,677	4,196	5,621	5,351	5,089	−6	2
***o*-Xylene**	799	918	995	1,082	1,013	985	854	703	1,056	1,068	832	−13	0
***p*-Xylene**	2,926	4,532	4,238	4,650	3,516	3,172	2,911	2,484	2,707	2,326	2,208	−35	3

a Preliminary. b Tar distillers not included; includes material for use in blending motor fuels. c All grades. d Rubber grade. e Preliminary figure; final figure not available. f Includes straight-chain dodecylbenzene, tridecylbenzene, and other straight-chain alkylbenzenes. g Mono-, di-, and triethanolamines. h Production figure may be too low, because some methyl chloride and ethylene dichloride were produced but not separated or measured accurately by some producers. i Approximate. j By weight. k Does not include data for coke ovens and gas retort ovens. l Includes refinery propylene. m Includes data for propane-propylene mixture. n Includes both acid and and dimethyl ester (DMT), without double counting. o Includes only dimethyl ester. p Figure may be too high because of possible double counting of some acid and ester. mg = millions of gallons. na = not available. **Source:** International Trade Commission

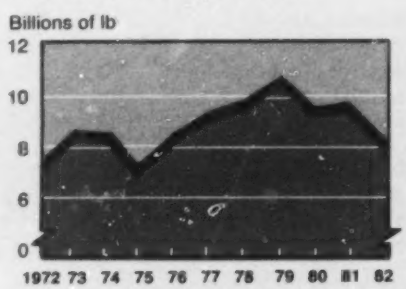
INORGANICS: Production in 1982 frequently little changed from a decade ago

Thousands of tons unless otherwise noted	Production											Annual Change	
	1982[a]	1981	1980	1979	1978	1977	1976	1975	1974	1973	1972	1981–82	1972–82
Aluminum sulfate[b]	1,186	1,294	1,286	1,315	1,309	1,255	1,202	1,146	1,257	1,233	1,193	−8%	0%
Ammonia,[c,d] 100%	15,488	19,076	19,653	18,634	17,119	17,765	16,716	16,419	15,733	15,208	15,169	−19	0
Ammonium nitrate,[e] 100%	7,331	8,936	9,128	8,293	7,210	7,177	7,186	7,088	7,542	7,235	6,863	−18	1
Ammonium sulfate,[d,f] 100%	1,785	2,194	2,136	2,363	2,449	2,264	2,010	2,106	2,120	1,987	1,858	−19	0
Chlorine gas[g]	9,120	10,767	11,421	12,291	11,052	10,573	10,378	9,167	10,753	10,402	9,854	−15	−1
Hydrochloric acid,[h] 100%	2,483	2,502	2,888	3,090	2,793	2,668	2,542	2,009	2,470	2,534	2,360	−1	1
Hydrogen,[i,j] bcf, 100%	91	103	107	106	90	85	82	74	82	65	59	−12	4
Nitric acid, 100%	7,608	9,077	9,231[k]	8,916[k]	7,934[k]	7,987[k]	7,791[k]	7,527[k]	8,120[k]	8,398[k]	7,981[k]	−16	0
Nitrogen gas,[i,l] bcf, 100%	484	490	479	427	379	328	289	252	243	227	194	−1	10
Oxygen,[i,l] bcf, 100%	358	431	431	456	430	392	388	353	390	385	352	−17	0
Phosphoric acid, 100% P_2O_5	8,523	9,922	10,848	10,318	9,637	8,745	7,949	7,677	7,213	6,927	6,712	−14	2
Phosphorus[m]	361	426	432	460	441	430	437	450	524	526	541	−15	−4
Sodium chlorate, 100%	247	302	312	269	265	251	199	173	203	204	194	−18	2
Sodium hydroxide, 100%	9,141	10,414	11,625	12,759	11,309	11,000	10,516	9,635	11,189	10,734	10,216	−12	−1
Sodium phosphate[n]	632	696	727	757	739	717	724	770	903	967	1,033	−9	−5
Sodium silicate[o]	649	788	805	8[illegible]3	829	760	747	724	770	723	661	−18	0
Sodium sulfate,[p] 100%	902	1,077	1,140	1,121	1,174	1,199	1,232	1,227	1,348	1,437	1,327	−16	−4
Sulfuric acid,[q] 100%	32,304	40,795	44,158	43,204	41,314	38,337	34,878	32,360	33,936	31,949	31,183	−21	−0
Titanium dioxide,[r] 100%	635	761	727	742	701	687	713	603	787	785	693	−17	−1
Urea, 100%	5,931	8,103	7,830	7,000	6,273	5,072	4,498	3,799	3,789	3,543	3,467	−27	6

a Preliminary. b Commercial, 17% Al_2O_3; includes municipalities except in 1981. c Synthetic anhydrous. d Excludes by-product ammonia liquor and ammonium sulfate. e Original solution. f Synthetic and noncoke by-product. g Includes quantities liquefied for use, storage, or shipment. h Includes anhydrous hydrochloric acid production. i High- and low-purity gas. j Liquid and gas; excludes amounts vented and used as fuel, and amounts produced in petroleum refineries for captive use. k Includes unspecified amounts of nitric acid produced but not withdrawn from the system. l Excludes amounts produced and consumed in making synthetic ammonia or ammonia derivatives. m Elemental, white (yellow), and red. n Tripolyphosphate (100% $Na_5P_3O_{10}$). o Soluble silicate glass (water glass), solid and liquid (anhydrous); excludes amounts produced and consumed in making meta-, ortho-, and sesquisilicates. p Anhydrous, high and low purity, and Glauber's salt. q Gross (new and fortified). r Composite and pure. **Note:** bcf = billions of cubic feet. **Sources:** Department of Commerce, International Trade Commission

MAN-MADE FIBERS: U.S. output in 1982 was the lowest since the mid-1970s

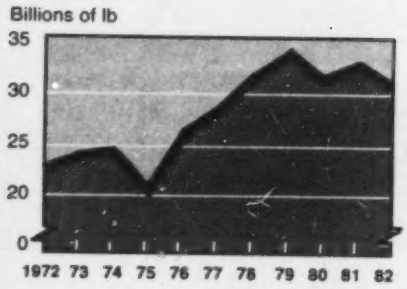
Man-made fibers production



Millions of lb	Production											Annual change	
	1982	1981	1980	1979	1978	1977	1976	1975	1974	1973	1972	1981–82	1972–82
CELLULOSIC FIBERS													
Acetate[a]	196	261	316	324	308	290	298	313	382	462	429	−25%	−8%
Rayon	388	509	490	606	597	598	543	436	817	895	965	−24	−9
NONCELLULOSIC FIBERS													
Acrylic[b]	624	691	779	761	726	709	621	525	631	742	626	−10	0
Nylon[c]	1927	2332	2358	2,720	2550	2326	2075	1857	2124	2175	1974	−17	0
Olefins[d]	723	785	748	759	692	635	577	497	531	492	416	−8	6
Polyester	3169	4176	3989	4,178	3800	3642	3340	2995	2926	2888	2328	−24	3
Textile glass	899	1041	867	1,014	923	787	676	546	683	688	572	−14	5
Other[e]	17	22	19	18	16	16	14	12	12	13	11	−23	4
TOTAL	**7943**	**9817**	**9566**	**10,381**	**9611**	**9002**	**8144**	**7181**	**8105**	**8354**	**7322**	**−20%**	**1%**

a Includes diacetate and triacetate; excludes production for cigarette filtration. b Includes modacrylic. c Includes aramid. d Includes olefin yarn and monofilaments, and olefin and vinyon staple and tow. e Includes only yarn and monofilaments; yarn is chiefly saran and spandex. **Source:** Textile Economics Bureau

Plastics production



PLASTICS: Output in 1982 dropped back to 1980's depressed level

Millions of lb[a]	Production											Annual change	
	1982	1981	1980	1979	1978	1977	1976	1975	1974	1973	1972	1981–82	1972–82
THERMOSETTING RESINS													
Epoxy[b]	286	336	315	361	299	261	244	198	249	223	184	−15%	4%
Polyester[c]	865	997	947	1,147	1,209	1,061	1,042	834	911	1,051	933	−13	−1
Urea	998	1,165	1,165	1,367	1,122	963	821	690	835	867	739	−14	3
Melamine	158	179	167	200	202	200	186	115	164	170	171	−12	−1
Phenolic[d]	2,006[e]	2,333[e]	1,499	1,781	1,617	1,458	1,340	1,051	1,335	1,387	1,453	−14	na
TOTAL	**4,313**	**5,010**	**4,094**	**4,857**	**4,448**	**3,943**	**3,631**	**2,888**	**3,494**	**3,698**	**3,481**	**−14**	**na**
THERMOPLASTIC RESINS													
Polyethylene													
Low density[f]	7,503	7,693	7,291	7,793	7,111	6,471	5,813	4,743	5,973	5,803	5,274	−2	4
High density[g]	4,928	4,695	4,405	5,010	4,201	3,652	3,125	2,468	2,837	2,637	2,325	5	8
Polypropylene	3,477	3,955	3,648	3,841	3,074	2,747	2,632	1,902	2,249	2,162	1,726	−12	7
Acrylonitrile-butadiene-styrene	740	916	920	1,191	1,134	1,069	988	642	857	877	810	−19	−1
Styrene-acrylonitrile	91	107	111	124	120	115	113	109	109	121	99	−15	−1
Polystyrene	3,191	3,621	3,521	4,005	3,823	3,446	3,195	2,662	3,364	3,322	3,139	−12	0
Styrene-butadiene copolymers and other styrene resins	640	829	785	916	878	813	756	585	679	703	624	−23	0
Polyamide, nylon type	228	312	274	327	275	254	247	135	204	205	157	−27	4
Polyvinyl chloride and copolymers	5,326	5,707	5,470	6,119	5,723	5,253	4,716	3,648	4,850	4,562	4,259	−7	2
Other vinyl resins[h]	177	208	196	220	197	197	225	187	209	199	194	−15	−1
TOTAL	**26,301**	**28,043**	**26,621**	**29,546**	**26,536**	**24,017**	**21,870**	**17,081**	**21,331**	**20,591**	**18,607**	**−6%**	**40%**

a Dry-weight basis, unless otherwise specified. b Unmodified. c Unsaturated. d Includes other tar acid resins. e Gross weight basis. f 0.940 density and below. g Density above 0.940. h Includes polyvinyl butyral, polyvinyl formal, and polyvinylidene chloride. **na = not available. Source:** Society of the Plastics Industry

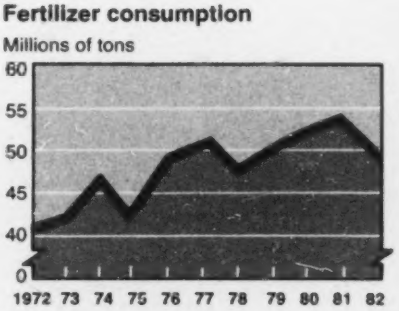
SYNTHETIC RUBBER: Output plunged last year from already low levels

Thousands of metric tons	Production											Annual change	
	1982	1981	1980	1979	1978	1977	1976	1975	1974	1973	1972	1981–82	1972–82
Styrene-butadiene rubber[a]	876	1032	1074	1378	1395	1395	1333	1179	1486	1537	1500	−15%	−5%
Polybutadiene	288	342	311	397	378	361	352	290	310	337	299	−16	0
Nitrile	45	66	63	75	73	70	73	55	88	84	75	−32	−5
Ethylene-propylene	123	178	144	175	174	158	130	84	126	120	91	−31	3
Polychloroprene	119	143	151	183	161	165	165	144	163	na	na	−17	na
Butyl				194	154	149	125	80	164	160	131		
Polyisoprene						62	74	61	93	119	134	−31	−5[b]
Other[c]	181[d]	261[d]	272[d]	132[d]	138[d]	56	51	47	88	270[e]	226[e]		
TOTAL	**1632**	**2022**	**2015**	**2534**	**2475**	**2418**	**2304**	**1941**	**2498**	**2627**	**2456**	**−19%**	**−4%**

a Excludes high-styrene latex (more than 45% styrene). b Annual change for 1972–82 calculated by comparing polychloroprene plus other (including butyl and polyisoprene) in 1982 with butyl, polyisoprene, and other (including polychloroprene) in 1972. c Excludes polyurethane rubber. d Includes butyl rubber in 1980–82 and polyisoprene in 1978–82. e Includes polychloroprene (neoprene). **na** = not available. **Source:** Rubber Manufacturers Association, Department of Commerce

1 Production by the U.S. Chemical Industry

FERTILIZERS: U.S. production and exports both slumped sharply last year



Note: Years ending June 30.
Source: Department of Agriculture

Thousands of tons	1982	1981	1980	1979	1978	1977	1976	1975	1974	1973	1972	Annual change 1981–82	Annual change 1972–82
Nitrogen (N)													
Domestic production	11,598	13,036	12,323	11,106	10,466	10,789	10,572	9343	10,094	9447	8971	−11%	3%
Imports	2,531	2,455	2,566	2,165	1,866	1,842	1,218	1198	1,068	882	843	3	12
Exports	2,499	3,088	2,641	2,468	1,778	1,251	1,239	1115	1,269	1508	1032	−19	9
Domestic supply	11,630	12,403	12,248	10,803	10,554	11,380	10,551	9426	9,893	8821	8782	−6	3
PHOSPHATE (P_2O_5)													
Domestic production	7,818	10,471	10,012	9,432	8,245	7,793	7,199	7230	6,869	6387	6150	−25	2
Imports	193	250	239	236	229	245	221	274	315	312	326	−23	−5
Exports	3,751	4,381	3,925	3,848	3,290	2,501	2,175	1860	1,581	1422	1102	−14	13
Domestic supply	4,260	6,340	6,326	5,820	5,184	5,537	5,245	5644	5,603	5277	5374	−33	−2
POTASH (K_2O)													
Domestic production	1,831	2,262	2,474	2,519	2,176	2,584	2,313	2287	2,604	2690	2432	−19	−3
Imports	4,797	5,487	5,403	5,085	4,948	4,955	3,910	3847	4,114	3192	3088	−13	5
Exports	641	876	1,048	999	1,003	994	911	848	947	922	657	−27	0
Domestic supply	5,987	6,873	6,829	6,605	6,121	6,545	5,312	5286	5,771	4960	4863	−13	2

Total fertilizer consumption in the U.S. down 10%

Thousands of tons	Consumption 1982	1981	1980	1979	1978	1977	1976	1975	1974	1973	1972	Annual change 1981–82	Annual change 1972–82
TYPE													
Mixed fertilizer	20,815	23,525	23,270	23,742	22,110	24,099	22,958	20,647	24,067	22,547	21,511	−12%	0%
Primary nutrient material[a]	27,918	30,463	27,221	25,600	23,511	24,999	23,935	19,959	20,897	19,275	18,385	−8	4
Secondary and micronutrients[b]	—	—	2,296	2,139	1,877	2,525	2,296	1,878	2,130	1,466	1,310	—	
TOTAL	**48,733**	**53,988**	**52,787**	**51,481**	**47,497**	**51,624**	**49,189**	**42,484**	**47,094**	**43,288**	**41,206**	**−10%**	**2%**
PRIMARY NUTRIENT CONTENT													
Nitrogen (N)	11,079	11,924	11,407	10,715	9,965	10,647	10,412	8,601	9,157	8,295	8,022	−7	3
Phosphate (P_2O_5)	4,818	5,434	5,432	5,606	5,096	5,630	5,228	4,507	5,099	5,085	4,864	−11	0
Potash (K_2O)	5,614	6,320	6,245	6,244	5,526	5,834	5,210	4,453	5,083	4,649	4,327	−11	3
TOTAL	**21,511**	**23,678**	**23,083**	**22,565**	**20,587**	**22,111**	**20,849**	**17,561**	**19,338**	**18,029**	**17,213**	**−9%**	**2%**

a Includes secondary and micronutrients in 1981 and 1982. b Included in primary nutrient material in 1981 and 1982. **Note:** Years ending June 30. **Source:** Department of Agriculture

NITROGEN OUTPUT: Ammonia slips 8%

Thousands of tons (N)	1982	1981	1980	1972	Change 1981–82
Ammonia[a]	5,032	5,455	5,270	3838	−8%
Ammonium nitrate[b,c]	1,105	1,225	1,096	1246	−10
Urea	1,684	1,704	1,572	585	−1
Ammonium sulfate[c]	432	555	521	497	−22
All other	3,345	4,097	3,864	2788	−18
TOTAL	**11,598**	**13,036**	**12,323**	**8954**	**−11%**

a Includes aqueous solutions. b Includes ammonium nitrate-limestone mixtures. c Adjusted for estimated quantity going into nonfertilizer uses. **Note:** Years ending June 30. **Source:** Department of Agriculture

PHOSPHATE OUTPUT: Dropped 25% in 1982

Thousands of tons (P_2O_5)	1982	1981	1980	1972	Change 1981–82
Ammonium phosphate[a]	4434	6,015	5,519	2430	−26%
Concentrated superphosphate	1151	1,713	1,737	1667	−33
Normal and enriched superphosphate	153	357	394	678	−57
All other	2080	2,386	2,372	1399	−13
TOTAL	**7818**	**10,471**	**10,012**	**6174**	**−25%**

a Liquid and solid, excluding that combined with potash salts in process of manufacture.

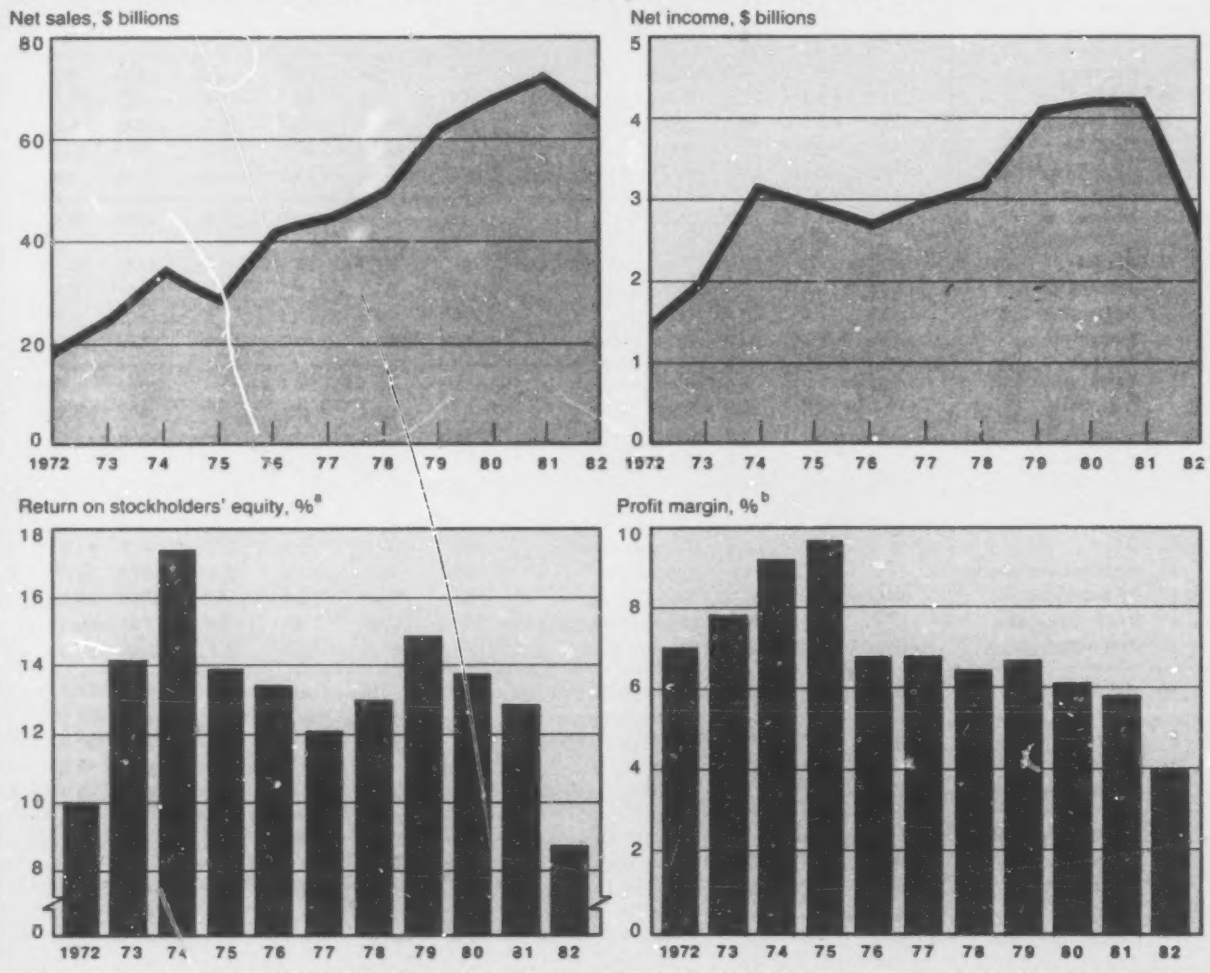
Profits staggered by lower demand, prices

For the chemical industry, as for nearly all other segments of U.S. business, 1982 was a financial wasteland. In contrast to the preceding 1980 recession, when a drop in physical demand was more than offset by higher selling prices, both demand and prices were weak last year. As a result, sales volume fell. For example, the dollar value of shipments of both industrial chemicals alone and chemicals and allied products as a whole declined for the first time since 1958, when the Department of Commerce began keeping its current series of statistics on manufacturers' shipments.

And despite Herculean efforts to cut operating expenses and the easing of some materials and energy costs, the industry's profits nosedived (again in contrast to 1980) in the wake of depressed revenues, rock-bottom levels of capacity utilization, and higher unit labor costs. Net income for the major chemical producers was off about a third from the year before, dropping to the lowest level since 1976.

Profitability, which had been slipping since 1979, also plummeted, down to what is probably the lowest level since World War II. Last year, chemical companies were earning less than half of what they were earning on each dollar of sales seven or eight years ago.

Sales of chemical producers fell last year for the first time since 1975 and earnings skidded to the lowest level since 1973, severely undercutting profitability



a After-tax earnings as a percentage of stockholders' equity. b After-tax earnings as a percentage of net sales. **Note:** Data based on annual figures for 30 major chemical companies.

TOP 100 CHEMICAL PRODUCERS: In 1982, few eked out an increase in their chemical sales . . .

Rank 1982	Rank 1981[a]	Company	Chemical sales 1982 ($ million)	Change from 1981	Chemical sales as % of total sales	Industry classification	Chemical operating profit[b]	Change from 1981	Chemical operating profits as % of total operating profits	Operating profit margin[c]	Identifiable chemical assets	Chemical assets % of total assets	Operating return on chemical assets[d]
1	1	Du Pont	$10,841	−5.8%	32.5%	Diversified	$417	−63.7%	10.6%	3.8%	$7745	36.6%	5.4%
2	2	Dow Chemical	8,252	−12.1	77.7	Basic chemicals	226	−63.1	63.5	2.7	8124	68.8	2.8
3	3	Exxon	7,259	−14.0	7.1	Petroleum	47	−86.5	0.6	0.6	5047	8.1	0.9
4	4	Monsanto	5,737[e]	−9.1	90.7	Basic chemicals	497	−26.0	99.2	8.7	5234	86.1	9.5
5	5	Union Carbide	4,985	−13.7	55.0	Basic chemicals	294	−49.3	44.7	5.9	6027	57.3	4.9
6	7	Shell Oil	3,085	−14.4	15.4	Petroleum	−56	def	def	def	3841	18.0	def
7	6	Celanese	3,062	−18.4	100.0	Basic chemicals	39	−82.3	100.0	1.3	2862	100.0	1.4
8	8	Standard Oil (Ind.)	2,786	−9.8	9.4	Petroleum	133	−36.7	3.7	4.8	2530	10.6	5.3
9	10	W. R. Grace	2,654	−4.0	43.2	Specialty chemicals	303	−23.5	50.2	11.4	1608	34.5	18.8
10	11	Allied	2,407	−13.7	39.0	Diversified	105	−50.2	13.4	4.4	1726	27.5	6.1
11	12	Phillips Petroleum	2,356	−4.6	15.0	Petroleum	23	−83.6	1.0	1.0	1563	14.9	1.5
12	9	Atlantic Richfield	2,242	−18.1	8.3	Petroleum	−96	def	def	def	2608	12.1	def
13	14	Eastman Kodak	2,151	−8.4	19.9	Photo equipment	205	−29.1	11.0	9.5	2001	19.3	10.2
14	15	Mobil	2,148	−7.6	3.3	Petroleum	6	−95.1	0.1	0.3	2075	5.8	0.3
15	16	Hercules	2,040	−10.3	82.6	Basic chemicals	75	−55.9	65.8	3.7	1468	90.4	5.1
16	13	Gulf Oil	2,006	−18.3	6.6	Petroleum	−329	def	def	def	1232	6.6	def
17	18	Rohm & Haas	1,727	−1.9	94.5	Basic chemicals	156	−16.6	98.7	9.0	1008	90.7	15.5
18	17	American Cyanamid	1,698[e]	−12.7	49.2	Basic chemicals	100	−49.5	43.4	5.9	1308	56.5	7.6
19	19	Stauffer Chemical	1,618	−6.3	100.0	Basic chemicals	285	−7.3	100.0	17.6	1756	100.0	16.2
20	20	American Hoechst	1,506[e]	−6.4	100.0	Basic chemicals	na	na	na	na	na	na	na
21	22	Texaco	1,497	−16.7	3.2	Petroleum	−20	def	def	def	953	4.5	def
22	23	Ethyl	1,411[e]	−6.9	87.4	Basic chemicals	161	4.5	84.5	11.4	959	86.7	16.8
23	28	Air Products[f]	1,359	−0.2	86.6	Basic chemicals	189	−4.2	93.7	13.9	1596	73.6	11.8
24	27	FMC	1,319	−4.6	37.7	Machinery	149	−23.4	81.7	11.3	1084	39.2	13.7
25	31	Ciba-Geigy	1,285	−0.9	68.0	Specialty chemicals	na	na	na	na	na	na	na
26	26	Occidental Petroleum	1,260[g]	−11.5	6.7	Petroleum	15	−86.4	0.8	1.2	1209	8.8	7.1
27	25	Borden	1,220[e]	−14.4	29.7	Dairy products	86	−37.7	29.5	7.0	1271	49.1	6.8
28	30	Ashland Oil	1,197	−10.0	13.1	Petroleum	28	−31.7	8.3	2.3	402	9.5	7.0
29	33	Union Oil of Calif.	1,153	−7.6	10.6	Petroleum	90[h]	−19.3	11.1	7.8	671	7.9	13.4
30	32	Mobay	1,132	−9.4	100.0	Basic chemicals	3[h]	−94.6	100.0	0.3	1213	100.0	0.3
31	21	Tenneco	1,108	−7.5	7.4	Petroleum	15	−53.1	0.9	1.4	963	6.2	1.6
32	24	U.S. Steel	1,077	−24.6	5.7	Steel	−31	def	def	def	592	3.0	def
33	34	Standard Oil of Calif.	1,047	−14.1	3.0	Petroleum	−16[h]	def	def	def	825	4.0	def
34	38	B. F. Goodrich	1,015	−3.1	33.8	Rubber products	1	−96.3	def	0.1	1186	50.0	0.1
35	29	International Minerals[i]	1,013	−17.4	64.9	Agri. chemicals	169	−43.0	79.1	16.7	1345	69.3	12.6
36	36	Olin	1,012	−6.0	55.5	Basic chemicals	22	−53.7	16.6	2.2	914	61.7	2.4
37	35	Diamond Shamrock	996	−12.7	31.3	Petroleum	83	−44.9	34.2	8.3	1024	32.1	8.1
38	37	CF Industries	919[e]	−12.8	100.0	Agri. chemicals	−38	def	def	def	1008	100.0	def
39	41	BASF Wyandotte	895	−7.5	100.0	Basic chemicals	−3	def	def	def	735	100.0	def
40	39	PPG Industries	893	−11.8	30.1	Glass products	39	−67.5	16.4	4.4	1045	32.0	3.7
41	40	Williams Cos.	826[e]	−15.9	49.0	Agri. chemicals	−30	def	def	def	981	51.7	def
42	42	Reichhold Chemicals	815	−14.2	100.0	Basic chemicals	17	−52.8	100.0	2.1	356	100.0	4.8
43	43	Lubrizol	812	−9.7	100.0	Specialty chemicals	103	−34.4	100.0	12.7	569	100.0	18.1
44	44	Eli Lilly	789	−5.8	26.6	Drugs	147	−12.0	20.8	18.6	638	26.6	17.5
45	45	National Distillers	758	−10.9	41.4	Alcoholic beverages	58	−49.1	50.9	7.7	614	35.9	9.4
46	46	Farmland Industries[i]	664	−18.6	11.8	Agri. supplies	−8	def	def	def	486	29.3	def
47	49	Dow Corning	663	−8.2	100.0	Specialty chemicals	53[h]	−30	100.0	8.0	na	na	na
48	51	Nalco Chemical	644	−3.4	100.0	Specialty chemicals	99	−18.9	100.0	15.4	465	100.0	21.3
49	53	Merck	644	−3.0	21.0	Drugs	60	−18.1	9.9	9.3	566	18.6	10.6
50	63	Kaiser Aluminum	642	−0.3	22.1	Nonferrous metals	44	−53.0	80.0	6.9	519	14.2	8.5

a Revised. b Sales less administrative expense and cost of selling. c Operating profit as a percentage of chemical sales. d Operating profit as a percentage of identifiable chemical assets. e Chemical sales include significant amounts of nonchemical products. f Fiscal year ended Sept. 30, 1982. g Does not include all chemical products. h Chemical net profit. i Fiscal year

. . . and all who did so ranked in size among the lower 50

Rank 1982	Rank 1981[a]	Company	Chemical sales 1982 ($ millions)	Change from 1981	Chemical sales as % of total sales	Industry classification	Chemical operating profits[b]	Change from 1981	Chemical operating profits as % of total operating profits	Operating profit margin[c]	Identifiable chemical assets	Chemical assets % of total assets	Operating return on chemical assets[d]
51	59	Esmark[k]	$630[e]	−3.0%	18.6%	Food	$ 23	−37.9%	12.6%	3.7%	$370	21.0%	6.2%
52	47	Georgia-Pacific	628	−14.9	11.6	Wood products	75	−49.7	31.9	11.9	1025	24.7	7.3
53	52	Borg-Warner	613	−7.7	19.2	Auto equipment	52	−15.4	22.8	8.5	297	17.7	17.5
54	54	Pennwalt	581	−9.4	61.0	Basic chemicals	46	−36.9	61.7	7.9	438	68.2	10.5
55	68	Standard Oil (Ohio)	554	12.8	4.1	Petroleum	−23	def	def	def	534	3.3	def
56	50	Koppers	535[e]	−21.1	33.8	Diversified	16	−64.1	25.4	2.9	327	29.7	4.7
57	47	Sun Co.	516	−30.8	3.1	Petroleum	na	na	na	na	na	na	na
58	56	Uniroyal	516	−10.0	26.2	Rubber products	42	−46.8	38.1	8.1	425	36.6	9.9
59	64	Witco Chemical	513	0.5	39.3	Specialty chemicals	39	−19.2	34.0	7.5	241	36.4	16.0
60	58	Badische	501	−11.0	100.0	Basic chemicals	−8	def	def	def	483	100.0	def
61	61	Aluminum Co. of America	493[e]	−5.7	10.7	Nonferrous metals	na	na	na	na	na	na	na
62	62	Kerr-McGee	488	−10.0	12.9	Petroleum	−10	def	def	def	656	18.1	def
63	57	NL Industries	477	−15.6	21.5	Petroleum services	61	−21.4	21.4	12.8	307	13.4	19.9
64	65	Airco	473	−5.4	41.7	Basic chemicals	na	na	na	na	na	na	na
65	66	Cabot[f]	471	−4.1	31.0	Specialty metals	62	−4.7	30.1	13.2	264	20.0	23.5
66	55	El Paso	468	−18.8	10.7	Natural gas	−102	def	def	def	331	7.9	def
67	70	National Starch	467	3.8	67.5	Specialty chemicals	na	na	na	na	na	na	na
68	69	International Flavors	448	−0.7	100.0	Specialty chemicals	104	2.0	100.0	23.2	432	100.0	24.1
69	60	Freeport-McMoRan	435	−21.4	58.2	Agricultural chemicals	94	−36.6	130.6	21.6	282	17.0	33.3
70	74	Polysar	432	9.4	100.0	Basic chemicals	na	na	na	na	na	na	na
71	71	Beatrice Foods	419	−6.1	4.6	Food	9	−85.7	1.3	2.1	na	na	na
72	72	Pfizer	391	−7.2	11.3	Drugs	−1	def	def	def	421	11.2	def
73	77	Liquid Air	371	13.4	82.6	Basic chemicals	48	5.1	99.4	12.9	435	84.8	10.5
74	75	Internorth	341	−7.6	8.2	Natural gas	2	−91.1	1.0	0.6	na	na	na
75	—	Henkel	475	nc	100.0	Specialty chemicals	na	na	na	na	na	na	na
76	85	H. B. Fuller[l]	332	0.9	100.0	Specialty chemicals	25	−18.9	100.0	7.5	207	100.0	12.1
77	73	Mississippi Chemical[l]	326	−4.6	100.0	Farm cooperative	25	−67.2	100.0	7.7	375	100.0	6.7
78	78	GAF	311	−4.6	49.8	Specialty chemicals	50	−11.5	210.5	16.1	196	41.9	25.5
79	86	Tyler	302	9.0	34.6	Diversified chemicals	12	−49.8	23.0	3.9	162	35.0	7.4
80	83	Rhône-Poulenc	300	0	100.0	Specialty chemicals	na	na	na	na	na	na	na
81	89	Big Three Industries	283	6.9	36.9	Petroleum services	80	1.1	47.5	28.1	489	46.3	16.4
82	93	Houston Natural Gas[m]	278	12.3	8.7	Natural gas	32	17.5	8.5	11.5	398	17.0	8.0
83	91	Petrolite[k]	275	5.6	90.9	Specialty chemicals	48	9.9	91.0	17.5	161	80.3	29.8
84	80	Terra Chemicals	273	−13.9	100.0	Agricultural chemicals	na	na	na	na	na	na	na
85	79	Upjohn	268	−17.3	14.7	Drugs	−35	def	def	def	183	9.1	def
86	84	Vulcan Materials	263	−12.0	36.5	Nonmetallic minerals	44	−37.2	49.5	16.7	na	na	na
87	88	Ingersoll-Rand	253	−6.2	14.8	Machinery	23	−13.4	12.7	9.1	105	11.5	22.0
88	76	American Petrofina	252	−24.9	11.2	Petroleum	−7	def	def	def	207	19.1	def
89	92	Soltex	250	0	100.0	Basic chemicals	na	na	na	na	na	na	na
90	90	SCM[l]	249[e]	−5.5	13.2	Paint	22	−28.2	26.8	9.0	273	24.3	8.2
91	95	Engelhard	248[e]	3.4	12.3	Specialty metals	49	4.0	57.2	19.8	238	31.5	20.6
92	—	Chemed	233	−1.3	93.6	Specialty chemicals	32	4.3	91.3	13.5	105	63.3	29.9
93	86	Martin Marietta	222	−19.7	6.3	Aerospace	19	−60.1	11.9	8.6	239	9.3	7.9
94	97	Loctite	216	1.2	100.0	Specialty chemicals	26	99.8	100.0	12.0	200	100.0	13.0
95	96	Baker Industries	210	1.6	100.0	Agricultural chemicals	−9	def	def	def	304	100.0	def
96	98	Stepan Chemical	208	1.4	100.0	Specialty chemicals	13	−16.6	100.0	6.0	163	100.0	7.7
97	—	Ferro	205[e]	−13.3	34.5	Specialty materials	8	−42.9	22.7	4.1	114	32.7	7.4
98	99	Getty	202	−1.0	1.6	Petroleum	1	−92.9	0.1	0.5	na	na	na
99	100	Agway	194	−3.0	5.1	Farm cooperative	na	na	na	na	na	na	na
100	—	Great Lakes Chemical	168	12.9	100.0	Specialty chemicals	29	4.7	100.0	17.3	202	100.0	14.4

ended June 30, 1982. j Fiscal year ended Aug. 31, 1982. k Fiscal year ended Oct. 31, 1982. l Fiscal year ended Nov. 30, 1982. m Fiscal year ended July 31, 1982. na = not available. nc = not comparable with previous year. def = deficit.

2 Finances of the U.S. Chemical Industry

SHIPMENTS: Dollar volume in chemicals fell in 1982 for the first time in more than a decade

$ Billions	1982	1981	1980	1979	1978	1977	1976	1975	1974	1973	1972	Annual change 1981–82	Annual change 1972–82
All manufacturing industries	$1886.0	$1994.6	$1851.0	$1727.2	$1523.4	$1358.4	$1185.6	$1039.1	$1017.5	$875.2	$756.3	−5%	10%
Chemicals and allied products	169.1	175.1	161.6	147.7	129.8	118.2	104.1	89.7	83.7	65.0	57.4	−3	11
Industrial chemicals[a]	54.4	60.7	56.4	52.3	44.8	41.5	35.6	29.4	26.6	19.0	16.6	−10	13
Drugs, soap, and toiletries	47.9	44.1	41.9	36.7	34.7	30.6	27.8	24.3	22.2	19.3	17.8	9	10
Petroleum and coal products	202.0	220.3	198.7	148.4	103.9	97.5	82.3	69.5	58.9	34.9	28.7	−8	22
Rubber and plastic products, nec	42.7	46.5	47.3	46.8	43.2	39.6	31.8	27.2	27.9	24.4	20.9	−8	7
Paper and allied products	78.2	79.5	72.6	65.2	57.0	52.1	48.2	41.7	41.8	32.8	28.3	−2	11

a Excluding pigments. nec = not elsewhere classified. **Source:** Department of Commerce

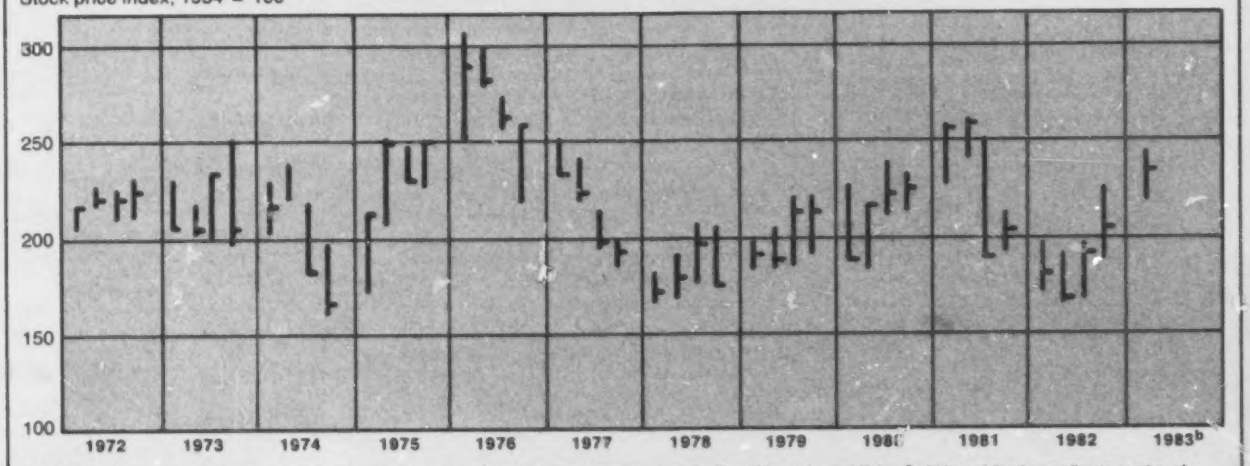
PRICES: Increases were small in 1982; some prices even dropped

Producer price indexes,[a] 1967 = 100	Annual average 1982	1981	1980	1979	1978	1977	1976	1975	1974	1973	1972	Annual change 1981–82	Annual change 1972–82
All commodities	299.3	293.4	268.8	235.6	209.3	194.2	183.0	174.9	160.1	134.7	119.1	2%	10%
Industrial commodities	312.3	304.1	274.8	236.5	209.4	195.1	182.4	171.5	153.8	125.9	117.9	3	10
Chemicals and allied products	292.4	287.6	260.3	222.3	198.8	192.8	187.2	181.3	146.8	110.0	104.2	2	11
Industrial chemicals	353.0	363.3	324.0	264.0	225.6	223.9	219.3	206.9	151.7	103.4	101.2	−3	13
Prepared paint	262.9	249.8	235.3	204.4	192.3	182.4	174.4	166.9	145.7	122.2	118.0	5	8
Paint materials	304.6	300.1	273.9	241.2	212.7	205.9	189.8	177.2	152.3	113.2	104.1	1	10
Drugs and pharmaceuticals	210.1	193.5	174.5	159.4	148.1	140.5	134.0	126.6	112.7	104.3	103.0	9	7
Fats and oils, inedible	267.1	295.6	298.0	376.7	315.8	279.0	249.9	255.2	338.2	228.3	115.8	−10	9
Agricultural chemicals and chemical products	292.7	285.0	257.1	214.4	198.4	187.8	188.4	203.6	137.7	96.6	91.7	3	12
Plastic resins and materials	283.3	289.2	279.2	235.9	199.8	195.7	194.0	180.9	143.8	92.1	88.7	−2	12
Other chemicals and allied products	269.8	254.2	224.5	191.8	181.8	175.7	170.7	168.6	147.5	118.1	113.5	6	9
Rubber and plastics products	241.6	232.6	217.4	194.3	174.8	167.6	159.2	150.2	136.2	112.4	109.3	4	8

a Formerly called "wholesale price indexes." **Source:** Department of Labor

Past year has brought sharp recovery in chemical stock prices

Stock price index, 1954 = 100[a]



a C&EN weighted stock price index of Allied Corp., American Cyanamid, Celanese, Dow Chemical, Du Pont, Monsanto, and Union Carbide; weighted according to number of shares outstanding for each company. b First quarter.

INDUSTRY BALANCE SHEET: Little change overall in total assets or liabilities

Industrial chemicals and synthetics

Assets	1982 ($ billions)	1981 ($ billions)	Change
Current assets:			
Cash and time deposits in U.S.	$ 0.97	$ 0.94	3%
Marketable securities	1.33	1.11	20
Receivables	12.78	13.04	−2
Inventories	11.55	12.98	−11
Other current assets	2.72	1.97	38
Total	**29.33**	**30.04**	**−2**
Fixed assets:			
Plant, property, and equipment	70.50	71.87	9
Less: accumulated depreciation and depletion	35.00	31.97	9
Net fixed assets	**43.50**	**39.90**	**9**
Other assets, including investments and intangibles	**15.52**	**16.46**	**−6**
TOTAL ASSETS	**$88.35**	**$86.40**	**2%**

Liabilities and stockholders' equity	1982 ($ billions)	1981 ($ billions)	Change
Current liabilities			
Accounts payable	$ 6.08	$ 6.71	−9%
Short-term loans	1.32	1.47	−10
Accrued income taxes	0.52	0.74	−30
Current portion of long-term debt	0.75	0.63	19
Other current liabilities	7.72	6.69	15
Total	**16.39**	**16.24**	**1**
Long-term debt	**21.03**	**21.41**	**−2**
Deferred taxes, minority interest, and other noncurrent liabilities	**6.79**	**6.21**	**9**
TOTAL LIABILITIES	**44.21**	**43.87**	**1**
Stockholders' equity			
Capital stock and other capital	17.44	15.55	12
Retained earnings	26.70	26.98	−1
TOTAL STOCKHOLDERS' EQUITY	**44.14**	**42.53**	**4**
TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY	**$88.35**	**$86.40**	**2%**

Source: Federal Trade Commission

DEBT RATIOS: Down slightly in 1982 for chemical companies but still higher than usual

$ Billions	1982	1981	1980	1979	1978	1977	1976	1975	1974	1973	1972
INDUSTRIAL CHEMICALS AND SYNTHETICS											
Long-term debt	$21.0	$21.4	$16.8	$14.8	$13.6	$12.3	$11.8	$10.2	$7.8	$7.2	$7.6
Stockholders' equity	$44.1	$42.5	$39.8	$32.3	$29.3	$26.3	$25.0	$22.8	$20.5	$18.7	$18.5
Debt ratio[a]	32.2%	33.5%	29.6%	31.4%	31.8%	31.9%	32.0%	30.8%	27.6%	27.8%	29.2%
CHEMICALS AND ALLIED PRODUCTS											
Long-term debt	$37.2	$36.9	$28.3	$24.9	$23.5	$21.1	$19.4	$16.8	$12.8	$10.7	$11.5
Stockholders' equity	$93.2	$89.9	$79.5	$67.4	$60.8	$54.9	$50.8	$45.7	$40.9	$36.7	$36.1
Debt ratio[a]	28.5%	29.1%	26.3%	27.0%	27.9%	27.8%	27.6%	26.9%	23.8%	22.6%	24.2%
ALL MANUFACTURING											
Long-term debt	$292.9	$266.5	$236.2	$204.8	$182.0	$167.3	$153.6	$145.2	$130.1	$112.9	$118.3
Stockholders' equity	$782.3	$762.3	$699.7	$624.0	$560.8	$511.7	$475.3	$435.5	$408.4	$368.0	$353.1
Debt ratio[a]	27.2%	25.9%	25.2%	24.7%	24.5%	24.6%	24.4%	25.0%	24.2%	23.5%	25.1%

a Long-term debt as a percentage of long-term debt plus stockholders' equity. **Note:** Because of changes in accounting rules and industry classifications, numbers over the entire range of years are not strictly comparable. **Source:** Federal Trade Commission

CASH FLOW: Companies trimmed working capital and made a big cut in debt last year

$ Millions, % of total	1982		1981		1980		1979		1978	
SOURCES OF FUNDS										
Net income	$ 2,892	17.9%	$ 4,358	18.2%	$ 3,981	33.2%	$ 3,801	36.3%	$3085	33.6%
Depreciation and depletion	5,073	31.5	4,267	17.9	3,818	31.8	3,602	34.4	3197	34.8
Deferred taxes	694	4.3	1,012	4.2	679	5.7	427	4.1	353	3.8
Other internal sources	2,167	13.4	1,833	7.7	815	6.8	1,093	10.5	930	10.1
Long-term debt	3,466	21.5	7,493	31.4	2,079	17.3	1,210	11.6	1545	16.8
Stock	1,834	11.4	4,931	20.6	630	5.2	322	3.1	84	0.9
TOTAL	**$16,126**	**100.0%**	**$23,894**	**100.0%**	**$12,002**	**100.0%**	**$10,454**	**100.0%**	**$9194**	**100.0%**
APPLICATIONS OF FUNDS										
Dividends	$ 2,003	12.4%	$ 1,845	7.7%	$ 1,603	13.4%	$ 1,474	14.1%	$1317	14.3%
Capital expenditures	8,506	52.7	8,344	34.9	7,027	58.5	5,633	53.9	5080	55.3
Additions to working capital	−1,842	−11.4	3,759	15.7	1,057	8.8	1,075	10.3	863	9.4
Reduction of long-term debt	4,335	26.9	1,493	6.3	1,119	9.3	1,042	10.0	879	9.5
Other applications	3,124	19.4	8,453	35.4	1,196	10.0	1,230	11.7	1054	11.5
TOTAL	**$16,126**	**100.0%**	**$23,894**	**100.0%**	**$12,002**	**100.0%**	**$10,454**	**100.0%**	**$9194**	**100.0%**

Note. Data are totals for 15 major chemical companies: Allied, American Cyanamid, Celanese, Diamond Shamrock, Dow Chemical, Du Pont, Ethyl, Hercules, Monsanto, Olin, Pennwalt, Rohm & Haas, Stauffer Chemical, Union Carbide, and Williams Cos. **Source:** Company annual reports

FINANCIAL ANALYSIS: Many analytical measures deteriorated last year

	Profit margin[a]	Return on investment[b]	Debt as % of debt plus equity	% total sales abroad[c]	% total assets abroad[d]	Sales per employee[e]	Dividends as % of net income	CAPITAL SPENDING[f] as % of sales	CAPITAL SPENDING[f] as % of net plant	R&D spending as % of sales	Sales as % of assets	Net plant as % of gross plant
SALES OVER $1 BILLION												
Air Products[g]	6.8%	3.6%	36.1%	22.1%	18.9%	$ 83	21.7%	22.1%	23.2%	2.4%	72.3%	61.5%
American Cynamid	3.8	3.2	24.7	35.3	26.5	86	63.6	5.0	13.2	5.2	115.2	49.8
Celanese	0.2	0.1	40.5	23.3	22.8	83	1340.0	9.0	17.1	3.3	107.0	43.0
Dow Chemical	3.2	2.3	41.0	52.2	44.5	188	101.8	7.8	13.9	4.3	89.9	53.2
Ethyl	5.8	5.5	30.9	25.4	11.0	115	36.2	22.8	55.3	2.4	138.9	55.0
FMC	4.3	4.4	22.3	33.4	13.6	109	37.5	8.0	22.0	3.2	126.5	58.3
B. F. Goodrich	def	def	33.2	16.3	13.7	100	def	5.0	11.1	2.0	145.1	59.6
W. R. Grace	5.2	5.4	37.2	18.9	5.3	75	40.9	9.1	20.7	1.0	124.7	64.3
Hercules	3.5	3.0	28.6	23.5	22.3	114	65.5	6.7	17.9	2.9	123.4	44.4
International Minerals[h]	7.8	4.9	30.4	14.3	9.1	186	56.6	10.4	13.7	na	80.3	63.3
Monsanto	5.2	8.3	22.3	29.1	19.9	121	48.0	10.6	20.3	4.0	104.1	52.2
National Distillers	4.3	4.5	18.0	na	na	na	102 5	3.6	13.4	na	149.1	52.0
Olin	3.5	2.5	26.7	6.1	10.2	104	44.4	7.6	16.5	2.6	111.4	47.2
PPG Industries	4.7	3.5	21.9	22.3	20.6	89	52.3	13.7	22.6	3.9	100.8	59.5
Rohm & Haas	4.7	4.3	22.9	37.1	27.3	158	41.9	6.9	23.0	5.0	133.9	42.1
Stauffer Chemical	7.7	4.4	28.3	13.2	9.8	148	50.0	10.9	14.8	3.8	73.9	60.5
Union Carbide	3.4	2.2	32.0	33.1	30.1	88	75.8	13.0	18.5	2.6	85.4	58.9
Williams Cos.	1.8	1.0	39.1	na	na	93	120.0	10.2	11.4	na	71.4	66.7
Witco Chemical	2.3	3.5	33.1	14.3	13.9	165	56.7	4.1	18.5	na	197.1	54.7
MEDIAN 1982	**4.3%**	**3.5%**	**30.4%**	**23.3%**	**18.9%**	**$109**	**52.3%**	**9.0%**	**17.9%**	**3.2%**	**111.4%**	**55.0%**
MEDIAN 1981	**5.2%**	**4.8%**	**27.4%**	**24.2%**	**17.1%**	**$120**	**36.8%**	**9.9%**	**21.3%**	**2.8%**	**119.1%**	**57.7%**
SALES FROM $150 MILLION TO $1 BILLION												
Chemed	6.7	14.0	58.3	14.9	13.8	na	81.0	2.0	16.2	0.9	149.7	63.1
Crompton & Knowles	1.8	2.9	24.4	21.8	23.0	91	100.0	1.7	10.9	2.0	165.1	61.2
Essex Chemical	4.0	4.0	61.0	na	na	170	35.9	16.3	41.0	1.5	117.7	67.5
First Mississippi[h]	10.4	5.8	24.5	18.0	na	193	21.6	30.4	36.9	na	56.5	67.9
Freeport-McMoRan	12.0	4.2	39.6	na	na	150	46.4	64.2	36.4	na	45.1	68.4
H. B. Fuller[i]	2.6	3.8	35.1	32.6	52.6	83	27.9	5.1	22.9	2.0	160.1	68.5
GAF	2.0	2.3	40.2	12.0	7.0	139	82.8	2.8	9.2	1.1	133.1	61.3
Great Lakes Chemical	9.4	6.7	21.9	17.7	na	na	23.8	10.9	16.8	3.4	86.4	66.7
International Flavors	14.1	12.4	0	66.9	51.7	124	59.0	6.3	20.9	6.8	103.8	58.8
Liquid Air	6.1	4.0	33.0	38.3	37.4	na	76.4	13.1	16.6	1.5	83.6	64.0
Loctite[h]	7.3	7.7	11.5	41.1	45.2	87	34.8	5.0	24.5	2.6	108.3	68.5
Lubrizol	5.9	6.0	4.0	59.8	42.6	190	88.9	6.4	17.9	4.4	126.3	58.8
Nalco Chemical	10.0	11.1	4.8	21.3	24.1	140	68.9	8.7	28.9	5.2	138.5	52.7
Pennwalt	2.6	2.4	31.3	19.1	18.6	100	95.1	8.0	22.3	3.2	125.9	52.0
Petrolite[j]	9.7	10.8	6.6	20.9	21.4	na	38.6	7.8	29.5	3.1	151.1	52.0
Reichhold Chemicals	0.6	1.0	25.8	16.6	13.1	182	134.0	2.5	12.9	0.8	222.1	58.1
Stepan	4.4	4.8	31.4	na	na	227	21.7	7.7	21.3	3.2	127.6	59.4
MEDIAN 1982	**6.1%**	**4.8%**	**25.8%**	**21.1%**	**22.2%**	**$140**	**59.0%**	**7.7%**	**21.3%**	**2.6%**	**126.3%**	**61.3%**
MEDIAN 1981	**7.4%**	**7.8%**	**23.4%**	**20.5%**	**23.8%**	**$141**	**36.8%**	**5.9%**	**20.5%**	**2.5%**	**133.6%**	**61.0%**

a Net income as a percentage of sales. b Net income as a percentage of current assets plus gross plant. c Consolidated sales only. d Foreign identifiable assets as a percentage of total assets. e Thousands of dollars. f Actual spending on construction of new facilities and purchase of new equipment and land in consolidated businesses. g For fiscal year ended Sept. 30, 1982. h For fiscal year ended June 30, 1982. i For fiscal year ended Nov. 30, 1982. j For fiscal year ended Oct. 31, 1982. **na** = not available. **def** = deficit. **Note:** Net income is from continuing operations, excluding extraordinary and nonrecurring items where possible.

CHEMICAL CAPITAL SPENDING: Many companies trim budgets drastically this year

$ Millions	1983[a]	1982	1981	1980	1979	1978	1977	1976	1975	1974	1973
Air Products	$ 275	$ 347	$ 323	$ 364	$ 246	$ 200	$ 143	$ 162	$ 151	$ 110	$ 67
American Cyanamid	190	171	181	196	235	251	235	232	204	139	83
Celanese	110	275	414	253	245	248	243	223	208	220	159
Diamond Shamrock	360	540	521	387	266	319	390	334	183	201	103
Dow Chemical	750	829	1176	1184	1268	1075	1163	1200	935	890	415
Du Pont[b]	1100	1300	1420	1297	864	714	704	876	1036	1008	781
Ethyl	100	368	141	156	123	96	88	88	69	75	35
W. R. Grace	495	560	657	658	514	313	279	234	309	303	174
Hercules	200	165	167	229	186	116	127	150	151	217	144
Monsanto	700	673	668	781	566	480	607	647	528	313	205
Olin	160	139	186	172	161	163	208	166	99	67	78
Rohm & Haas	85	126	182	93	68	66	79	110	106	106	73
Stauffer Chemical	170	177	239	246	239	201	193	199	199	83	45
Union Carbide	950	1179	1186	1129	831	688	805	965	862	517	289
TOTAL	$5645	$6849	$7461	$7145	$5812	$4930	$5264	$5577	$5040	$4249	$2651
ANNUAL CHANGE	−18%	−7%	4%	23%	18%	−6%	−6%	11%	19%	60%	29%

a Planned. b Excludes Conoco. **Note:** Figures are for worldwide spending on construction, equipment, and land in consolidated businesses. Where possible, acquisition costs and investments in nonconsolidated businesses are excluded. **Source:** Company data

The much talked about last year's recession took its toll on capital spending by the U.S. chemical industry, driving it down from year-earlier levels as companies moved to protect financial resources at the expense of investment in new plant. Moreover, the recession drove down demand for chemicals so far that its effects are spilling over into this year as well. Chemical companies realize that there is so much shut-down capacity that they will not have to build plants for many products anytime in the immediate future. For some products, in fact, producers are saying that there is enough idle capacity to last well into the late 1980s.

An update of C&EN's annual worldwide capital spending survey by 14 major U.S. chemical firms shows that spending on new plant and equipment in 1983 will be about $5.6 million, 18% below levels for last year. Capital spending in 1982 for the same companies decreased 7% from its peak of $7.5 billion in 1981.

C&EN's survey is in sharp contrast with the government's estimates of capital spending by the much broader chemicals and allied products category. The Commerce Department estimates that capital spending in 1983 will increase 3% after a 2% drop for 1982. This means, according to Commerce Department figures, that capital spending in 1983 will total $13.69 billion, compared to $13.27 billion in 1982, for chemicals and allied products.

For spending by wholly owned foreign affiliates of U.S. chemical companies, the Commerce Department projects an increase of almost 4% in 1983 to about $3.0 billion from $2.9 billion in 1982, moving back to its level in 1981.

Many of the plant and equipment projects that had been planned in recent years are finished, and there are few plans to build more at this time. This is evident in the Conference Board's survey of appropriations for capital spending for chemicals and allied products. According to the Conference Board, in spite of the decrease in capital spending in 1982, the backlog of unspent appropriations also fell. The backlog at the end of 1982 totaled $7.39 billion, 22% below the backlog at the end of fourth-quarter 1981.

According to C&EN's survey, chemical capital spending as a percentage of sales in 1982 rose to 10.5% from 10.2% in 1981. The figure was propped up somewhat by the decline in sales last year in the chemical industry. In 1983, on the other hand, C&EN projects that capital spending will be only about 8% of sales, as spending on new plant and equipment continues to decline but sales begin their recovery.

2 Finances of the U.S. Chemical Industry

INDUSTRY CAPITAL SPENDING: Small increase planned for chemicals and allied products

$ Billions	1983[a]	1982	1981	1980	1979	1978	1977	1976	1975	1974	1973
Chemicals	$ 13.69	$ 13.27	$ 13.60	$ 12.60	$10.78	$ 8.46	$ 8.14	$ 8.12	$ 7.63	$ 6.48	$ 4.24
Iron and steel	2.56	3.47	3.17	3.29	3.09	2.52	2.79	3.04	3.03	1.94	1.25
Nonferrous metals	2.38	2.71	3.46	3.11	2.39	2.11	1.88	1.97	2.18	2.04	1.30
Paper	6.09	5.97	6.72	6.80	5.55	3.99	3.59	3.11	2.96	2.90	2.00
Petroleum	24.57	26.69	26.56	20.69	16.21	13.95	12.70	10.76	9.59	7.31	4.68
Rubber	1.84	1.71	1.77	1.73	2.17	2.10	1.66	1.32	1.15	1.56	1.55
Stone, clay, glass	2.43	2.61	3.14	3.82	3.94	3.10	2.23	1.88	1.67	1.64	1.58
All manufacturing	115.90	119.68	126.79	115.81	98.68	79.72	69.22	59.95	54.92	53.21	42.37

a Estimate. **Source:** Department of Commerce

Chemical industry has been trimming its backlog of unspent capital funds

$ Billions	1982	1981	1980	1979	1978	1977	1976	1975	1974	1973	1972
Chemicals	$ 7.4	$ 9.4	$ 9.6	$ 8.5	$ 7.2	$ 7.4	$ 7.1	$ 6.9	$ 6.6	$ 4.9	$ 2.9
Iron and steel	2.8	5.4	3.9	4.5	4.0	3.6	4.7	5.4	5.8	2.4	1.9
Nonferrous metals	3.2	3.7	3.7	2.9	2.7	2.9	2.4	2.2	2.7	2.2	1.1
Paper	5.0	5.1	4.0	4.2	3.2	2.6	2.0	2.7	2.9	1.7	1.1
Petroleum, coal	22.6	29.7	26.7	16.1	14.6	15.0	12.2	14.1	12.8	7.1	4.3
Rubber	1.0	0.9	1.0	0.9	0.9	0.8	0.7	0.6	0.7	0.9	0.8
Stone, clay, glass	1.7	1.9	2.0	2.3	2.4	2.0	1.5	1.4	1.7	1.5	0.8
All manufacturing	70.4	92.7	91.9	76.7	63.4	56.5	47.5	46.4	49.8	37.1	23.3

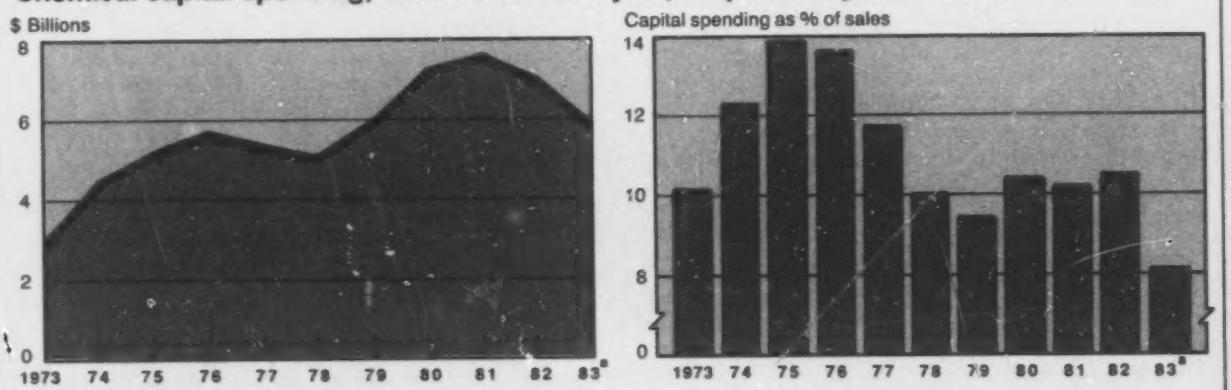
Note: Figures are for fourth quarter each year. **Source:** Conference Board

Overseas investment by U.S. chemical firms has shown little change recently

$ Billions[a]	1983[b]	1982	1981	1980	1979	1978	1977	1976	1975	1974	1973
Chemicals and allied products	$ 3.0	$ 2.9	$ 3.0	$ 3.0	$ 2.6	$ 1.9	$ 2.0	$ 2.7	$ 2.5	$ 2.1	$1.4
Metals, primary and fabricated	1.0	0.9	0.8	0.9	0.6	0.6	0.5	0.7	0.7	0.7	0.8
All manufacturing	17.2	16.6	19.2	19.5	15.4	12.0	10.5	10.9	11.3	11.6	9.2
Petroleum	17.2	17.7	15.6	14.8	11.0	9.5	8.9	7.9	8.9	7.8	6.4

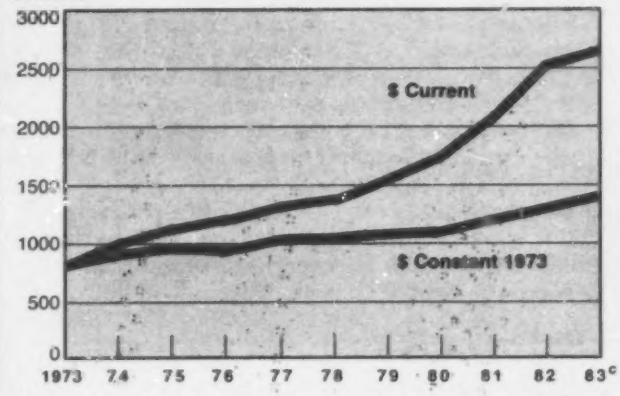
a By majority-owned foreign affiliates of U.S. companies; data after 1976 are not consistent with earlier years. b Planned. **Source:** Department of Commerce

Chemical capital spending, down for second year, drops to 10-year low relative to sales

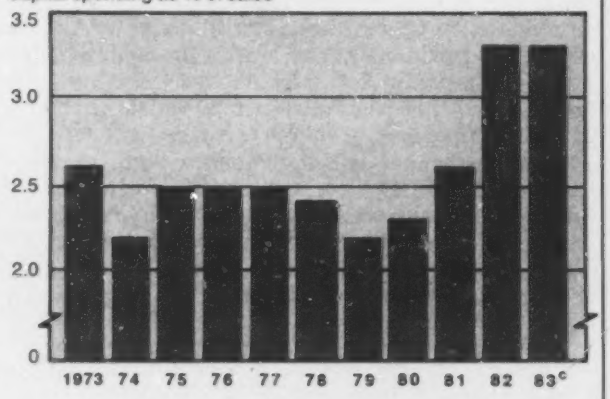


a Planned. **Source:** Worldwide data for 14 major U.S. basic chemical companies

Chemical companies' spending on R&D will make a moderate gain this year . . .



. . . but will hold steady relative to company sales volume



a R&D spending by basic chemical companies. b By basic chemical companies. c Estimates.
Sources: Worldwide data for 15 U.S. basic chemical companies, Battelle Columbus Laboratories, C&EN estimates

Although support for research and development by the U.S. chemical industry is not increasing so fast as it was just a year ago, it has not dwindled as has capital spending.

C&EN's survey of 15 basic chemical companies shows that R&D spending in 1983 will increase only 7% to about $2.7 billion from about $2.5 billion in 1982. Spending in 1982 was up 20% from 1981's $2.1 billion. In fact, the planned increase for 1983 is the lowest since 1978, when R&D spending went up only 6%.

The small increase in 1983 may be only a pause; companies continue to say that they have to refine process and product technology to meet increased raw material and energy costs. Thus, once earnings rebound, there may be a return to the larger annual increases that occurred in the past few years. Between 1978 and 1982, spending by the 15 chemical companies surveyed increased at an average annual rate of about 16%. After adjusting for inflation, however, the increase was just 7% per year. This year, adjusting for expected inflation, R&D spending will increase a mere 2%.

In 1982, R&D spending by the chemical industry rose to 3.3% of sales, the highest it has been in more than a decade. However, the increase from 2.5% the year before came while sales in the industry were falling. For 1983, C&EN estimates that spending as a percentage of sales will hold around the 3.3% level as both spending and sales increase at about equal rates.

CHEMICAL R&D SPENDING: Most budgets are higher, but increases are often moderate

$ Millions	1983[a]	1982	1981	1980	1979	1978	1977	1976	1975	1974	1973
Air Products	$ 40	$ 37	$ 32	$ 30	$ 24	$ 23	$ 24	$ 19	$ 16	$ 11	$ 8
American Cyanamid	200	181	164	142	124	108	96	83	73	64	52
Celanese	100	102	104	94	92	83	77	70	64	58	49
Diamond Shamrock	46	48	53	45	37	32	26	24	20	14	12
Dow Chemical	480	460	404	314	269	232	203	188	167	149	118
Du Pont[b]	890	790	575	485	415	377	367	353	336	344	286
Ethyl	39	39	38	34	29	26	28	25	28	25	22
W. R. Grace	71	62	55	45	42	37	32	28	30	32	28
Hercules	68	71	61	53	47	40	37	35	30	30	25
Monsanto	284	256	221	204	161	136	132	114	116	87	82
Olin	48[c]	47	39	31	26	25	25	25	24	19	na
Pennwalt	34	31	27	24	22	23	21	19	16	14	13
Rohm & Haas	94[c]	92	77	67	54	49	45	43	45	39	32
Stauffer Chemical	64	62	51	44	37	34	33	29	24	20	17
Union Carbide	240	240	201	166	161	156	156	143	120	94	77
TOTAL	$2698	$2518	$2102	$1778	$1540	$1381	$1302	$1198	$1109	$1000	$821
ANNUAL CHANGE	7%	20%	18%	15%	12%	6%	9%	8%	11%	20%	5%

a Planned. b Excludes Conoco. c C&EN estimate. Source: Company data

2 Finances of the U.S. Chemical Industry

The financial strains of a severe business recession are clearly visible spread across the pages of the annual reports issued by chemical companies for 1982. And so they show up, as well, in the data for the 33 individual chemical companies that are tabulated (together with figures for 16 pharmaceutical firms) on this and the following four pages.

Nearly four times as many chemical companies recorded lower sales last year as turned in a gain. And although the industry was not plagued with the net losses that swept through the steel or auto industries, only a couple of chemical companies showed any gain in earnings. For more than two thirds of the companies, in fact, last year's earnings trailed those of 1980 as well as those of 1981.

Balance sheets, too, showed the impact of financial stress. For nearly half the chemical companies, total assets surprisingly were down last year. And for a quarter of the companies, so was net worth.

The pharmaceutical companies, on the other hand, firmly demonstrated their traditional immunity to the vicissitudes of the business cycle. Only a couple of the 16 companies listed earned less in 1982 than during the preceding year. About two thirds of them, moreover, even were able to improve either their return on stockholders' equity or their profit margins—or both.

Explanation of table headings

Year. Data are for calendar year unless otherwise indicated.

Net sales. Gross sales, less discounts, allowances, and returns; generally excludes excise taxes and other operating income or revenues.

Net income. Net sales and other income, less operating costs, nonoperating charges, depreciation, depletion, interest expense, deferred charges, minority interest in income, and taxes. Nonrecurring or extraordinary credits and charges have been excluded in most cases, but these items are indicated by a footnote.

Total assets. Sum at year's end of current assets, investments, prepaid expenses, net plant and equipment, and other tangible assets. Excludes insofar as possible intangible assets including goodwill, value of patents and trademarks, and the like.

Current ratio. The ratio of current assets (cash, marketable securities, receivables, and inventories but excluding prepaid expenses) to total current liabilities.

Net plant and equipment. Value at year's end of fixed assets, less accumulated depreciation, amortization, and depletion.

Capital expenditures. Total spending during the year for new fixed assets, such as plant, equipment, and land, and for replacement and modernization of facilities.

Net worth. Equity at year's end of preferred and common stock holders, including value of capital stock, capital and earned surplus, and surplus reserves, as well as contingency and miscellaneous reserves for which no definite purpose is stated. Intangible assets are deducted insofar as possible.

Net income (breakdown). **Per cent of sales:** net income divided by net sales. **Per cent of net worth:** net income divided by tangible net worth. **Dollars per share:** net income, less preferred dividends, divided by the number of shares of common stock outstanding. All figures are adjusted for stock splits, but no adjustment has been made for earlier years as a result of stock dividends or for dilution that might result from the conversion of preferred stock or debt to common stock or the exercise of stock options outstanding.

Dividends per share. Cash dividends paid (or declared) on each share of common stock; excludes the value of stock dividends, which are indicated by a footnote.

Dividend yield. Dividends per share divided by the average of the high and low prices of the common stock during the calendar year.

Stock price range. High-low market prices of common stock during the calendar year, adjusted for stock splits but not for stock dividends.

Price-earnings ratio. Average of the high and low prices of the common stock during the calendar year divided by net income per share of common stock.

Year	Net sales	Net income	Total assets	Current ratio	Net plant and equipment	Capital expenditures	Net worth	NET INCOME: % of sales	NET INCOME: % of net worth	NET INCOME: $ per share	Dividends, $ per share	Dividend yield, % of price	Stock price range, $ per share	Price-earnings ratio
	Money figures in thousands of dollars unless otherwise indicated													
CHEMICALS														
Air Products & Chemicals														
1982[a]	$1,568,916	$105,654[b]	$2,118,882	1.2	$1,497,162	$346,680	$867,565	6.7%	12.2%	$3.68[b]	$0.80	2.5%	$41 1/8–23 5/8	8.8
1981[a]	1,570,115	126,039	1,871,986	1.2	1,301,922	323,465	769,134	8.0	16.4	4.42	0.80	1.9	48 7/8–34	9.4
1980[a]	1,420,759	115,502	1,744,392	1.3	1,182,567	364,013	658,596	8.1	17.5	4.07	0.80	1.8	54 1/4–32 1/4	10.6
1979[a]	1,229,894	97,540	1,415,024	1.3	945,013	246,050	563,702	7.9	17.3	3.45	0.65	2.1	37 1/4–23 3/4	8.8
Allied Corp.														
1982	$6,167,000	$280,000[c]	$6,140,000	1.3	$2,658,000	$524,000	$3,661,000	4.5%	7.6%	$6.46[c]	$2.40	6.5%	$45 5/8–28 3/4	5.7
1981	6,407,000	343,000[d]	5,205,000	1.4	2,866,000	609,000	2,352,000	5.4	14.6	9.03[d]	2.35	4.8	59 7/8–39	5.5
1980	5,519,000	303,000[e]	4,475,000	1.3	2,384,000	533,000	1,861,000	5.5	16.3	8.59[e]	2.15	4.3	61 3/4–39	5.9
1979	4,332,391	201,080[f]	4,159,758	1.1	2,168,816	408,668	1,377,701	4.6	14.6	6.84[f]	2.00	5.1	49 1/2–28 1/2	5.7
American Cyanamid Co.														
1982	$3,453,674	$132,127	$2,985,004	2.0	$1,296,204	$171,047	$1,526,390	3.8%	8.7%	$2.74	$1.75	5.7%	$37 1/2–24 3/8	11.3
1981	3,649,073	197,054	3,049,917	1.9	1,325,063	180,697	1,513,457	5.4	13.0	4.11	1.675	5.5	36 1/2–24 1/2	7.4
1980	3,453,934	159,195	2,900,289	1.8	1,328,691	195,819	1,419,073	4.6	11.2	3.32	1.60	5.5	38–20 5/8	8.8
1979	3,186,998	168,495	2,810,725	1.6	1,303,308	235,416	1,331,130	5.3	12.7	3.52	1.60	5.3	36 1/8–23 3/4	8.5
Baker Industries Corp.														
1982	$210,185	($5,256)[g]	$304,073	0.8	$178,796	$18,534	$102,015	...	...	($0.44)[g]	0.00	0.0	$8 1/2–3 7/8	...
1981	206,813	1,254[h]	342,935	1.0	189,135	65,486	115,289	0.6%	1.1%	0.11[h]	0.00	0.0	25–7 1/2	147.7
1980	248,079	25,691[i]	286,821	1.3	133,850	32,150	119,748	10.4	21.5	2.21[i]	0.00	0.0	25–8 7/8	7.7
1979	227,790	12,916[j]	241,476	1.2	111,765	5,864	91,760	5.7	1.41	1.12[j]	0.00	0.0	15 3/4–3 5/8	8.6

a Fiscal year ends Sept. 30. b Excludes extraordinary gain on debt-for-equity exchange of $2.8 million ($0.10 per share) and credit for cumulative effect of change in accounting principle for investment tax credit of $61.9 million ($2.16 per share). c Excludes nonrecurring net loss of $8 million ($0.2[1] per share). d Excludes nonrecurring net gain of $5 million ($0.14 per share). e Excludes nonrecurring net loss from estimated plant shutdown and disposal costs of $14 million ($0.44 per share). f From continuous operations; excludes net losses from discontinued businesses of $164.8 million ($5.75 per share) and nonrecurring net loss of $25.4 million ($0.89 per share). g Net loss; excludes net loss from discontinued operations and their disposition of $8.0 million ($0.68 per share). h Excludes net loss from discontinued operations of $6.1 million ($0.52 per share). i Excludes net earnings from discontinued operations of $3.2 million ($0.28 per share). j Excludes net gain on sale of 50% interest in phosphate assets of $23.5 million ($2.04 per share).

Year	Net sales	Net income	Total assets	Current ratio	Net plant and equipment	Capital expenditures	Net worth	NET INCOME % of sales	NET INCOME % of net worth	NET INCOME $ per share	Dividends, $ per share	Dividend yield, % of price	Stock price range, $ per share	Price-earnings ratio
	Money figures in thousands of dollars unless otherwise indicated													
Big Three Industries														
1982	$767,785	$ 86,812	$1,055,313	3.0	$773,777	$162,293	$609,792	11.3%	14.2%	$2.05	$0.72	3.3%	$28½–15⅛	10.6
1981	823,280	108,854	1,015,259	2.7	680,709	158,234	555,765	13.2	19.6	2.57	0.60	1.9	37⅝–25	12.2
1980	659,121	86,604	815,048	2.2	583,772	142,542	472,607	13.1	18.3	2.05	0.47[a]	1.7	36⅛–18⅞	13.4
1979	509,449	62,859	700,052	2.3	483,921	79,710	404,137	12.3	15.6	1.56	0.42	2.2	22¼–15¾	12.2
Cabot Corp.														
1982[b]	$1,567,658	$ 88,007	$1,300,553	2.2	$664,434	$138,342	$624,069	5.5%	14.1%	$2.77	$0.92	4.4%	$25½–16⅛	7.5
1981[b]	1,622,755	110,167	1,238,729	2.2	595,234	192,348	586,226	6.8	18.8	3.50	0.86	2.9	35½–23⅞	8.5
1980[b]	1,403,743	94,024[c]	1,138,683	2.0	456,507	117,705	497,546	6.7	18.9	3.00[c]	0.67	2.6	36⅝–14¾	8.5
1979[b]	1,122,391	70,445	918,431	2.0	401,638	68,266	358,031	6.3	19.7	2.23	0.47	3.5	16⅝–10⅛	5.9
Celanese Corp.														
1982	$3,062,000	($34,000)[d]	$2,862,000	1.9	$1,608,000	$275,000	$1,131,000	...	...	($2.45)[d]	$4.00	7.9%	$59⅞–41¼	...
1981	3,752,000	144,000	2,991,000	2.0	1,518,000	414,000	1,233,000	3.8%	11.7%	9.01	3.85	5.4	69¼–51⅝	6.7
1980	3,348,000	122,000	2,633,000	2.0	1,197,000	253,000	1,101,000	3.6	11.1	8.20	3.50	6.8	62⅝–36⅛	6.2
1979	3,146,000	141,000	2,374,000	1.8	1,150,000	245,000	1,033,000	4.5	13.6	9.52	3.10	7.0	48¼–29⅜	4.6
Crompton & Knowles Corp.														
1982	$213,250	$5,199	$117,902	2.6	$33,055	$3,582	$59,320	2.4%	8.8%	$1.44	$1.04	6.6%	$19⅝–12⅛	9.1
1981	243,412	8,571	132,197	2.3	32,668	6,699	63,606	3.5	13.5	2.51	0.95	6.1	18⅛–12⅞	6.2
1980	241,776	7,666	135,619	2.5	34,731	9,623	58,935	3.2	13.0	2.22	0.80	5.8	16⅝–10⅞	6.2
1979	239,638	7,075	131,433	2.2	28,822	7,995	55,212	3.0	12.8	2.03	0.69	6.6	12¼–8⅝	5.1
Diamond Shamrock Corp.														
1982	$3,177,379	$149,543[e]	$3,123,191	1.6	$2,114,436	$612,698	$1,336,409	4.7%	11.2%	$2.37[e]	$1.76	8.3%	$25¾–16½	8.9
1981	3,376,215	230,156[f]	2,933,550	1.9	1,726,458	520,917	1,266,900	6.8	18.2	3.68[f]	1.70	5.4	39⅝–23¾	8.6
1980	3,143,040	201,214	2,707,284	2.1	1,600,250	381,036	1,155,950	6.4	17.4	3.66	1.62	5.2	36⅞–23⅛	8.5
1979	2,356,858	178,123	2,329,892	1.9	1,382,931	256,564	931,267	7.6	19.1	3.37	1.51	6.0	31½–19	7.5
Dow Chemical Co.														
1982	$10,618,000	$342,000[g]	$11,612,000	1.8	$5,961,000	$ 829,000	$4,845,000	3.2%	7.1%	$1.77[g]	$1.80	7.4%	$28⅞–19⅝	13.7
1981	11,873,000	564,000	12,268,000	1.7	6,174,000	1,176,000	4,663,000	4.8	12.1	3.00	1.80	5.8	39–23⅝	10.4
1980	10,626,000	753,000[h]	11,429,000	1.5	5,672,000	1,184,000	4,331,000	7.1	17.4	4.14[h]	1.60	4.7	39¼–28¼	8.2
1979	9,255,387	734,000[i]	10,144,745	1.4	5,236,404	1,267,719	3,789,748	7.9	19.4	4.05[i]	1.45	4.9	34⅞–24⅜	7.3
E. I. du pont de Nemours & Co.														
1982	$33,331,000	$ 894,000	$24,343,000	1.7	$14,004,000	$3,295,000	$10,850,000	2.7%	8.2%	$3.75	$2.40	6.5%	$44⅜–30	9.9
1981	22,810,000	1,081,000[j]	23,829,000	2.0	12,722,000	2,389,000	10,458,000	4.7	10.3	5.81[j]	2.75	6.0	56–35¾	7.9
1980	13,652,000	716,000	9,560,000	2.3	4,414,000	1,279,000	5,690,000	5.2	12.6	4.83	2.75	6.8	49½–31⅛	8.3
1979	12,571,800	938,900	8,918,700	2.5	3,942,400	864,000	5,290,600	7.5	17.7	6.42	2.75	6.5	48¼–37	6.6
Ethyl Corp.														
1982	$1,614,626	$94,166	$1,458,534	2.2	$666,186	$ 91,915	$766,175	5.8%	12.3%	$2.34	$0.75	5.7%	$17⅛–9	5.6
1981	1,757,195	90,891	1,194,630	2.2	658,282	140,520	683,001	5.2	13.3	2.28	0.75	5.3	17¼–10⅞	6.2
1980	1,740,627	82,397[k]	1,138,233	2.4	602,029	156,388	631,831	4.7	13.0	2.05[k]	0.75	5.1	18¼–11⅛	7.1
1979	1,656,977	97,515	1,070,968	2.8	512,981	122,878	536,671	5.9	18.2	2.47	0.675	5.3	15–10½	5.2
Ferro Corp.														
1982	$595,830	$10,277[l]	$345,922	2.0	$133,318	$22,650	$161,945	1.7%	6.3%	$1.37[l]	$1.20	4.9%	$30½–18½	17.9
1981	702,213	25,503	389,405	2.1	135,587	24,243	222,441	3.6	11.5	3.30	1.20	4.6	31½–20¾	7.9
1980	695,580	29,019	430,472	2.0	134,563	31,505	220,597	4.2	13.2	3.77	1.20	5.8	24¼–17	5.5
1979	591,930	30,912	387,703	1.8	115,831	33,132	200,625	5.2	15.4	4.07	1.14	4.7	29⅝–19	5.9
First Mississippi Corp.														
1982[m]	$222,977	$23,212[n]	$394,587	1.0	$183,994	$67,882	$145,407	10.4%	16.0%	$1.11	$0.24	2.2%	$ 16–6	9.9
1981[n]	357,697	29,704	318,926	1.5	117,244	58,277	138,384	8.3	21.5	1.38	0.23	1.2	26⅛–13⅛	14.2
1980[m]	242,690	21,154	236,579	2.1	83,525	37,202	113,672	8.7	18.6	0.98	0.18	0.9	30⅜–7½	19.5
1979[m]	178,400	4,661	200,370	2.8	63,942	17,046	95,073	2.6	4.9	0.22	0.18	2.0	11⅜–4	35.8
W. R. Grace & Co.														
1982	$6,127,600	$319,500[o]	$4,854,300	1.7	$2,706,400	$559,500	$2,136,600	5.2%	15.0%	$6.62[o]	$2.70	7.2%	$46¼–28½	5.6
1981	6,520,800	361,300[p]	4,947,100	1.5	2,528,600	656,900	1,986,600	5.5	18.2	7.58[p]	2.45	5.0	59⅝–38½	6.5
1980	6,101,300	283,800[q]	4,281,500	1.5	2,162,700	657,400	1,713,100	4.7	16.6	6.08[q]	2.175	4.5	53½–32⅝	7.9
1979	5,266,629	222,580[r]	3,680,847	1.6	1,629,361	477,688	1,524,276	4.2	14.6	5.02[r]	1.975	5.9	41¼–25⅝	6.7
Great Lakes Chemical Corp.														
1982	$169,703	$13,945	$202,058	2.2	$113,659	$19,143	$120,913	8.2%	11.5%	$1.93	$0.52	1.6%	$40¼–24⅞	16.9
1981	150,333	18,031	170,198	1.9	98,580	22,777	108,875	12.0	16.6	2.51	0.44	0.9	58½–36¼	18.9
1980	126,705	18,948	118,407	3.2	61,747	20,496	93,258	15.0	20.3	2.67	0.36	0.8	51¼–35⅝	16.3
1979	122,491	18,606	99,323	2.8	48,802	18,315	75,457	15.2	24.7	2.65	0.28	0.9	39⅛–22½	11.7

a Plus 5% stock dividend. b Fiscal year ends Sept. 30. c From continuing operations; excludes net income from discontinued operations of $12.3 million ($0.39 per share) and net gain on sale of machinery division of $46.4 million ($1.49 per share). d Net loss; includes special charge related to 40% equity in Mexican affiliate of $39 million ($2.50 per share). e Excludes extraordinary net gain from debt-for-equity exchange of $35.5 million ($0.57 per share). f From continuing operations; excludes net loss from operations and disposal of plastics and animal nutrition businesses of $108.9 million ($1.74 per share). g Includes pretax gain on sales of investments of $102 million but excludes extraordinary net gain on debt-for-equity exchange of $57 million ($0.30 per share). h Excludes net gain on sale of Wanda Petroleum Co. of $52 million ($0.28 per share). i Excludes net gain on sale of Canadian oil and gas properties of $50 million ($0.28 per share). j Excludes cumulative effects of change in accounting for investment tax credits of $320 million ($1.74 per share). k Excludes net gain on sale of property of $7.3 million ($0.19 per share). l Includes loss on divestitures of $1.9 million ($0.23 per share). m Fiscal year ends June 30. n From continuing operations; excludes net loss from discontinued FirstMiss subsidiary of $6.4 million ($0.30 per share). o Includes gain on restructuring Chemed Corp. of $65.1 million and net losses on disposal of businesses of $600,000. p Includes net gains on disposal of businesses of $31.1 million. q Includes net losses on disposal of businesses of $10.3 million. r Includes net gains on disposal of businesses of $5.2 million.

Year	Net sales	Net income	Total assets	Current ratio	Net plant and equipment	Capital expenditures	Net worth	NET INCOME % of sales	NET INCOME % of net worth	NET INCOME $ per share	Dividends, $ per share	Dividend yield, % of price	Stock price range, $ per share	Price-earnings ratio
					Money figures in thousands of dollars unless otherwise indicated									
Hercules														
1982	$2,468,971	$ 86,651[a]	$2,001,354	2.2	$923,676	$164,997	$1,078,911	3.5%	8.1%	$1.97[a]	$1.32	5.8%	$28¾–16⅞	11.6
1981	2,718,366	136,481	1,997,144	2.5	907,733	167,189	1,051,357	5.0	13.0	3.09	1.26	5.6	26⅜–18¾	7.3
1980	2,485,226	114,000	1,889,679	2.0	872,656	229,163	1,009,746	4.6	11.3	2.60	1.20	6.0	25–15⅛	7.7
1979	2,345,425	144,500[b]	1,761,177	1.9	772,889	185,998	945,422	6.2	15.3	3.27[b]	1.075	5.5	22¾–16⅛	5.9
Philip A. Hunt Chemical Corp.														
1982	$114,849	$5,273	$87,953	2.6	$34,281	$4,104	$57,899	4.6%	9.1%	$0.93	$0.40	3.0%	$ 18–8⅝	14.3
1981	111,871	3,816[c]	87,238	2.6	36,231	9,105	56,005	3.4	6.6	0.67[c]	0.40	3.9	12⅛–8½	15.4
1980	106,296	4,044[d]	78,020	3.0	32,376	6,930	56,788	3.8	7.1	0.71[d]	0.40	3.5	14¼–8½	16.0
1979	106,004	8,015	72,794	3.4	29,067	9,206	55,606	7.6	14.4	1.41	0.40	2.9	17–11	9.9
International Flavors & Fragrances														
1982	$447,889	$63,160	$431,589	4.1	$135,565	$28,369	$335,902	14.1%	18.8%	$1.73	$1.01	4.3%	$ 30–17⅜	13.7
1981	451,088	66,123	430,990	3.8	125,977	16,558	329,878	14.7	20.0	1.81	0.94	4.6	23–17⅛	11.3
1980	449,309	63,232	414,859	3.8	121,278	17,461	315,485	14.1	20.0	1.73	0.86	3.9	27½–16⅝	12.8
1979	409,299	61,472	387,807	3.6	114,215	15,180	285,425	15.0	21.5	1.68	0.74	3.4	25⅝–18¼	13.1
International Minerals & Chemical Corp.														
1982[e]	$1,560,400	$122,300[f]	$1,941,900	1.8	$1,941,900	$161,600	$1,010,200	7.8%	12.1%	$4.56[f]	$2.60	8.6%	$36⅞–23½	6.6
1981[e]	1,984,900	153,800	1,975,200	1.7	1,896,300	336,600	975,300	7.7	15.8	5.63	2.46	5.1	66½–30⅜	8.6
1980[e]	1,789,600	145,900	1,948,600	2.0	1,062,900	262,100	881,300	8.2	16.6	5.38	2.16	4.5	66½–30	9.0
1979[e]	1,474,700	120,800	1,537,600	1.7	936,600	173,500	791,2[illegible]	8.2	15.3	4.48	1.87	5.8	41–23½	7.2
Liquid Air Corp.														
1982	$448,996	$27,512	$503,090	1.8	$353,376	$58,657	$247,801	6.1%	11.1%	$2.13	$1.60	9.1%	$20¾–14¾	8.3
1981	427,991	31,529[g]	465,128	1.6	285,026	61,818	239,776	7.4	13.1	2.86[g]	1.55	6.7	29¾–16¾	8.1
1980	408,249	27,448[h]	425,502	1.6	270,778	60,469	202,832	6.7	13.5	2.57[h]	1.40	5.2	34½–19¾	10.6
1979	368,109	24,698	399,354	1.7	258,006	50,714	191,641	6.7	12.9	2.49	1.40	5.3	26¾–23¾	10.5
Lubrizol Corp.														
1982	$631,284	$ 47,561	$843,744	2.6	$288,504	$51,589	$462,044	5.9%	10.3%	$1.21	$1.08	5.7%	$23¾–14¼	15.7
1981	878,291	92,031	673,165	2.6	284,068	75,399	478,518	10.5	19.2	2.36	1.08	3.9	35½–20⅜	11.8
1980	902,312	111,511	651,137	2.5	248,664	92,140	452,787	12.4	24.6	2.87	0.90	2.7	41¾–24⅞	11.6
1979	724,734	90,775	519,942	2.5	180,405	50,807	374,751	12.5	24.2	2.33	0.80	3.2	30–20½	10.8
Monsanto Co.														
1982	$6,325,000	$329,000[i]	$6,077,000	2.4	$3,313,000	$673,000	$3,496,000	5.2%	9.4%	$8.21[i]	$3.95	5.4%	$ 89–56⅝	8.9
1981	6,947,700	445,100[j]	6,069,200	2.2	3,183,900	667,900	3,330,200	6.4	13.4	11.50[j]	3.75	5.1	87½–59½	6.4
1980	6,573,600	148,800[k]	5,796,400	1.9	3,109,100	780,500	2,808,200	2.3	5.3	4.10[k]	3.55	6.3	70¼–42¼	13.7
1979	6,192,600	331,000[l]	5,539,100	2.2	2,817,800	565,900	2,781,800	5.3	11.9	9.11[l]	3.35	6.3	62–45	5.9
Nalco Chemical Co.														
1982	$643,863	$54,356[m]	$464,868	2.2	$194,450	$56,241	$336,488	10.0%	19.1%	$1.62[m]	$1.12	4.3%	$ 34–18	16.0
1981	666,591	81,209	466,175	2.2	176,959	59,423	335,974	12.2	24.2	2.02	1.00	4.0	29⅛–20½	12.3
1980	616,799	72,261	416,233	2.7	138,137	34,923	306,550	11.7	23.6	1.80	0.80	3.9	26⅝–14	11.2
1979	578,908	63,277	368,074	2.5	126,774	30,018	261,966	10.9	24.2	1.59	0.68	4.4	17⅝–13⅛	9.7
Olin Corp.														
1982	$1,823,137	$62,800[n]	$1,636,027	1.7	$839,974	$139,015	$805,185	3.4%	7.8%	$2.66[n]	$1.20	5.7%	$26½–15½	7.8
1981	2,001,346	92,836	1,618,034	1.6	844,927	186,331	793,187	4.6	11.7	3.88	1.15	4.9	27–19½	6.0
1980	1,852,853	73,931[o]	1,550,128	1.7	822,412	172,016	750,120	4.0	9.9	3.06[o]	1.025	5.8	23⅛–12½	5.8
1979	1,778,102	71,150	1,461,073	1.7	784,108	161,151	739,992	4.0	9.6	2.97	0.97	4.7	25–16⅛	6.9
Pennwalt Corp.														
1982	$ 952,400	$24,502[p]	$737,048	1.6	$342,785	$76,466	$346,364	2.6%	7.1%	$2.37[p]	$2.20	7.8%	$34⅞–21½	11.9
1981	1,056,118	36,661[q]	755,755	2.1	309,525	52,696	367,098	3.5	10.0	3.55[q]	2.20	7.1	36–26¼	8.8
1980	1,188,702	43,291	810,761	2.0	314,315	55,546	373,363	3.6	11.6	4.20	2.20	7.4	34⅜–25⅜	7.1
1979	1,079,303	49,997	775,355	2.1	298,420	67,486	346,140	4.6	14.4	5.01	2.20	6.1	35⅞–30½	6.6
Reichhold Chemicals														
1982	$814,911	$ 6,875[r]	$364,133	2.5	$159,181	$20,516	$200,546	0.8%	3.4%	$0.57[r]	$0.48	3.2%	$19⅝–10	26.0
1981	950,112	17,054[s]	405,477	2.3	173,398	15,908	206,727	1.8	8.2	2.04[s]	0.48	3.5	16–11⅛	6.6
1980	825,059	16,114	424,760	2.1	179,550	22,656	203,941	1.8	7.9	1.90	0.61	5.0	15–9⅝	6.5
1979	874,854	12,230	425,478	2.0	179,960	26,114	194,619	1.4	6.3	1.34	0.74	5.4	16–11¼	10.2
Rohm & Haas Co.														
1982	$1,828,027	$85,605[t]	$1,365,163	2.5	$546,623	$125,927	$807,853	4.7%	10.6%	$6.63[t]	$2.80	4.5%	$79⅛–45½	9.4
1981	1,884,664	93,385[u]	1,348,627	2.4	537,489	181,635	759,911	4.9	12.2	7.21[u]	2.56	4.3	71¾–46¾	8.2
1980	1,725,304	93,744	1,240,456	2.6	488,185	93,013	703,124	5.4	13.3	7.26	2.16	4.9	55¼–32¾	6.1
1979	1,590,484	95,495[v]	1,191,903	2.3	487,841	68,328	637,398	6.0	15.0	7.39[v]	1.76	4.4	48½–31½	5.4

a Excludes extraordinary net gain on debt-for-equity exchange of $11.6 million ($0.25 per share). b Excludes net gain on sale of pigments and methanol assets of $28.0 million ($0.62 per share). c From continuing operations; excludes net loss on disposal of photofinishing business of $146,000 ($0.03 per share). d From continuing operations; excludes net loss on operations and disposal of photofinishing business of $1.9 million ($0.33 per share). e Fiscal year ends June 30. f From continuing operations; excludes earnings and net gain on disposal of discontinued chemical operations of $15.1 million ($0.57 per share). g Includes net gain on sale of assets, before taxes, of $1.0 million. h Excludes net gain on sale of assets of $2.0 million ($0.19 per share). i Excludes extraordinary net gain on debt-for-equity exchange of $23 million ($0.58 per share) but includes net loss on sale of European acrylic fibers business of $18 million ($0.46 per share). j Includes net gain on sale of joint venture of $67.7 million ($1.75 per share). k Includes net loss on withdrawal from polyester filament business in the U.S. of $69.0 million ($1.90 per share) and from termination of Aiscondel of $38.7 million ($1.07 per share). l Includes nonrecurring net charges for shutdown of European businesses of $53.2 million ($1.47 per share). m Excludes net loss on discontinued Industrial Bio-Test Laboratories operations of $6.2 million ($0.16 per share). n Excludes special charge for DDT claims, net, of $9.5 million ($0.40 per share). o Excludes net charge for restructuring of Winchester group of $40.0 million ($1.07 per share). p From continuing operations; excludes provision for loss on disposal of discontinued operations of $2.8 million ($0.27 per share). q From continuing operations; includes cost of shutdown of chlorine-caustic plant, before taxes, of $21.5 million but excludes net loss on operations and disposal of discontinued businesses of $11.4 million ($1.10 per share) and nonrecurring net gain from cumulative effect of change in accounting for investment credit of $16.3 million ($1.57 per share). r Excludes net loss resulting from asset redeployment/divestiture program of $2.2 million ($0.32 per share). s Excludes extraordinary net charge for settlement of litigation of $2.4 million ($0.34 per share). t Includes net gain on shutdown and disposal of assets of $10.4 million ($0.80 per share); u Includes net loss from shutdown and disposal of assets of $6.6 million ($0.50 per share). v Excludes extraordinary tax credit of $7.3 million ($0.57 per share).

Year	Net sales	Net income	Total assets	Current ratio	Net plant and equipment	Capital expenditures	Net worth	NET INCOME % of sales	NET INCOME % of net worth	NET INCOME $ per share	Dividends, $ per share	Dividend yield, % of price	Stock price range, $ per share	Price-earnings ratio
	Money figures in thousands of dollars unless otherwise indicated													
Stauffer Chemical Co.														
1982	$1,618,235	$123,547	$2,170,162	2.5	$1,200,576	$176,872	$1,065,751	7.6%	11.6%	$2.81	$1.41	6.2%	$28¾–17	8.1
1981	1,726,236	150,093[a]	2,013,863	2.4	1,170,253	238,555	1,009,034	8.7	14.9	3.41[a]	1.29	5.5	27¾–18¾	6.8
1980	1,695,219	121,743[b]	2,084,441	1.4	1,072,896	246,454	909,490	7.2	13.4	2.77[b]	1.175	6.0	24⅜–14½	7.0
1979	1,526,160	135,961	1,846,866	1.7	1,040,542	239,303	821,777	8.9	16.5	3.10	1.075	5.0	25–17¾	6.9
Stepan Chemical Co.														
1982	$208,373	$5,303	$163,326	1.3	$75,475	$16,148	$55,067	2.5%	9.6%	$1.45	$0.56	4.1%	$18⅛–9¼	9.4
1981	204,522	6,545[c]	176,068	1.5	67,906	12,083	53,888	3.2	12.1	1.74	0.515	3.0	21⅞–12⅜	9.8
1980	157,517	3,683[d]	137,685	1.5	64,338	9,204	50,498	2.3	7.3	0.98[d]	0.47	4.5	12¼–8½	10.5
1979	144,981	4,794[e]	112,700	2.3	66,121	13,575	46,399	3.3	10.3	1.28[e]	0.415	4.2	11¾–8¼	7.8
Union Carbide Corp.														
1982	$ 9,061,000	$310,000	$10,552,000	1.9	$6,356,000	$1,178,000	$5,095,000	3.4%	6.1%	$ 4.47	$3.50	6.7%	$ 61–40⅞	11.3
1981	10,168,000	649,000	10,366,000	2.1	5,794,000	1,186,000	5,206,000	6.4	12.5	9.56	3.30	6.1	62½–45¼	5.6
1980	9,994,000	673,000[f]	9,600,000	2.1	5,207,000	1,129,000	4,717,300	6.7	14.3	10.08[f]	3.10	7.1	52½–35¼	4.4
1979	9,176,500	556,200[g]	8,710,000	2.1	4,458,300	831,300	3,949,900	6.1	14.1	8.47[g]	2.90	7.4	44½–34	4.6
Williams Cos.														
1982	$1,691,315	$ 29,682[h]	$2,369,791	1.7	$1,513,712	$171,895	$1,029,411	1.8%	2.9%	$1.00[h]	$1.20	5.6%	$29⅜–13⅛	21.2
1981	1,976,336	99,167[i]	2,445,877	1.6	1,497,797	233,184	1,027,245	5.0	9.7	3.32[i]	1.20	3.4	46⅝–23½	10.6
1980	2,072,686	138,696	2,380,001	1.8	1,417,799	339,625	965,715	6.7	14.4	5.07	1.10	2.9	49⅜–26¾	7.5
1979	1,850,013	69,450	2,005,511	1.7	1,190,526	112,995	737,949	3.8	9.4	2.55	1.00	4.2	32¼–15	9.3
Witco Chemical Corp.														
1982	$1,305,418	$29,842	$643,911	2.2	$291,914	$54,130	$281,013	2.3%	10.6%	$3.15	$1.80	7.2%	$29½–20⅜	8.0
1981	1,291,876	38,580	707,181	1.7	281,945	55,479	277,973	3.0	13.9	4.14	1.65	6.1	31½–22¾	6.6
1980	1,175,695	40,954	612,882	2.1	238,761	45,663	248,315	3.5	16.5	4.50	1.50	5.6	33¾–20¼	6.0
1979	966,758	42,782	551,891	1.9	192,902	40,890	222,686	4.4	19.2	4.83	1.30	5.1	30½–20	5.2
PHARMACEUTICALS														
Abbott Laboratories														
1982	$2,602,447	$289,123	$2,566,909	1.1	$901,059	$223,900	$1,310,886	11.1%	22.1%	$2.37	$0.84	2.5%	$41¼–25⅜	16.1
1981	2,342,524	247,283	2,355,613	1.1	729,402	200,600	1,152,050	10.6	21.5	2.01	0.72	2.6	32¼–23⅜	13.9
1980	2,038,156	214,413	2,062,835	1.2	583,214	162,548	1,027,222	10.5	20.9	1.73	0.60	2.6	28½–17	13.2
1979	1,683,168	178,981[j]	1,729,296	1.3	466,970	109,636	896,028	10.6	20.0	1.48[j]	0.50	2.7	21⅝–14¾	12.3
American Home Products Corp.														
1982	$4,582,096	$560,103	$2,602,346	2.6	$725,350	$153,812	$1,614,192	12.2%	34.7%	$3.59	$2.15	5.3%	$ 48–33¼	11.3
1981	4,131,237	497,332	2,517,541	3.0	492,879	99,852	1,583,475	12.0	31.4	3.18	1.90	5.8	37¼–28⅛	10.3
1980	3,798,524	445,889	2,289,460	2.8	450,490	99,393	1,391,972	11.7	32.0	2.84	1.70	6.4	31⅞–21⅜	9.4
1979	3,401,301	396,039	2,007,977	3.0	408,899	87,809	1,239,315	11.6	32.0	2.51	1.50	5.6	29½–24⅜	10.7
Baxter Travenol Laboratories														
1982	$1,671,445	$186,885	$1,792,710	1.9	$628,720	$148,812	$1,061,009	11.2%	17.6%	$2.64	$0.46	1.1%	$ 51–30⅜	15.4
1981	1,503,890	150,581	1,590,743	2.6	583,084	87,101	978,325	10.0	15.4	2.15	0.38	1.3	33¾–24	13.4
1980	1,374,384	128,400	1,412,638	2.8	560,690	118,645	852,606	9.3	15.1	1.86	0.32	1.4	28⅜–17⅞	12.4
1979	1,191,193	111,908[k]	1,290,928	2.3	500,976	103,654	723,510	9.4	15.5	1.14[k]	0.25	1.2	24¾–17¾	12.9
Bristol-Myers Co.														
1982	$3,599,900	$348,700	$2,665,800	2.2	$653,600	$170,000	$1,624,000	9.7%	21.5%	$5.18	$2.035	3.3%	$ 74–50¾	12.0
1981	3,496,700	305,800	2,406,000	2.2	581,800	159,300	1,482,000	8.7	20.6	4.58	1.78	3.4	58¾–45¾	11.4
1980	3,158,300	270,600	2,125,500	2.3	484,900	131,660	1,296,200	8.6	20.9	4.06	1.56	3.8	52–30½	10.1
1979	2,752,777	231,545	1,837,648	2.4	407,528	95,022	1,117,002	8.4	20.7	3.50	1.385	4.0	38¼–31	9.9
Eli Lilly & Co.														
1982	$2,962,711	$411,828	$3,155,125	1.8	$1,135,575	$236,642	$2,055,460	13.9%	20.0%	$5.42	$2.60	4.7%	$65¼–45½	10.2
1981	2,773,205	374,478	2,902,262	1.9	1,006,180	253,735	1,888,260	13.5	19.8	4.93	2.375	4.2	68¾–45¼	11.6
1980	2,558,637	341,974	2,607,452	2.0	849,034	230,700	1,736,693	13.4	19.7	4.52	2.20	4.0	65½–45¾	12.3
1979	2,205,764	329,531	2,179,132	2.4	672,610	172,678	1,570,439	14.9	21.0	4.52	1.95	3.5	63⅞–47⅛	12.3
Merck & Co.														
1982	$2,[illegible]017	$415,137	$3,647,652	1.9	$1,557,490	$295,106	$2,203,928	13.6%	18.8%	$5.61	$2.80	3.7%	$88¼–64	13.6
1981	2,929,455	398,255	3,310,000	1.7	1,395,567	322,814	2,001,460	13.6	19.9	5.36	2.60	2.9	103–76¼	16.7
1980	2,734,012	415,396	2,865,755	2.3	1,185,244	256,488	1,863,322	15.2	22.3	5.54	2.30	3.2	86–58¼	13.0
1979	2,384,627	381,776	2,614,064	2.2	1,027,644	170,134	1,665,496	16.0	22.9	5.06	1.90	2.8	74¼–62½	13.5

a Excludes net loss on facility disposal and asset write-down of $169,000. b Excludes net gain on disposal of facilities of $14.8 million ($0.34 per share). c Includes loss on sale of flavor compounding business, before taxes, of $890,000. d Excludes net gain on sale of Polychem department of $1.7 million ($0.95 per share). e Excludes net gain on sale of fragrance business of $528,000 ($0.28 per share). f Excludes cumulative effect of change in accounting principle for investment tax credit of $217 million ($3.28 per share). g Includes net charge on sales and disposals of assets of $21.1 million. h From continuing operations: excludes net income from discontinued operations of $4.7 million ($0.15 per share). i From continuing operations: excludes net income from discontinued operations of $10.4 million ($0.35 per share). j Includes net gain on sale of animal health business of $1.8 million ($0.02 per share). k Includes net gain on sale of assets of $450,000.

2 Finances of the U.S. Chemical Industry

Year	Net sales	Net income	Total assets	Current ratio	Net plant and equipment	Capital expenditures	Net worth	NET INCOME % of sales	NET INCOME % of net worth	NET INCOME $ per share	Dividends, $ per share	Dividend yield, % of price	Stock price range, $ per share	Price-earnings ratio
	Money figures in thousands of dollars unless otherwise indicated													
Pfizer														
1982	$3,453,600	$332,800	$3,644,500	1.9	$1,124,700	$265,500	$1,869,500	9.6%	17.8%	$4.26	$1.84	3.9%	$80⅝–49⅞	15.3
1981	3,249,700	273,700[a]	3,544,200	1.9	998,200	287,100	1,594,700	8.4	17.2	3.63[a]	1.60	3.4	54⅞–40	13.1
1980	3,029,300	254,800	3,247,300	1.9	825,000	163,600	1,456,500	8.4	17.5	3.48	1.44	3.4	53¾–32	12.3
1979	2,746,025	237,869	2,945,280	2.0	759,269	133,300	1,310,074	8.7	18.2	3.26	1.32	3.7	41¾–29	10.9
Richardson-Vicks														
1982[b]	$1,115,600	$66,900	$687,100	2.0	$247,000	$57,500	$394,600	6.0%	17.0%	$2.74	$1.48	5.6%	$32½–20½	9.7
1981[b]	1,088,100	83,200[c]	672,200	1.7	208,600	49,300	365,300	7.5	22.8	3.47[c]	1.32	4.7	34¾–21¾	8.1
1980[b,d]	1,211,651	84,209	829,551	2.0	242,568	52,630	427,938	6.9	19.7	3.56	1.20	4.3	38⅛–17½	7.8
1979[b,d]	1,090,546	62,956	718,229	2.1	209,251	47,545	376,852	5.8	16.7	2.66	1.06	4.5	27–19¾	8.8
A. H. Robins Co.														
1982	$482,324	$48,693[e]	$386,843	3.8	$98,079	$15,815	$267,945	10.1%	18.2%	$1.98[e]	$0.52	3.3%	$20⅛–11¼	7.9
1981	450,854	44,228[f]	385,483	3.0	96,457	28,103	251,742	9.8	17.6	1.77[f]	0.44	3.8	14¾–8½	6.6
1980	432,328	25,470[g]	337,318	2.9	80,511	30,273	227,142	5.9	11.2	1.01[g]	0.42	4.4	12½–9⅝	9.5
1979	386,425	44,746[h]	329,072	2.8	59,994	16,687	222,148	11.6	20.1	1.71[h]	0.40	4.0	12–8¼	5.9
Schering-Plough Corp.														
1982	$1,817,900	$183,500	$2,341,100	1.8	$747,500	$180,400	$1,278,500	10.1%	14.4%	$3.39	$1.68	4.8%	$43¾–26¼	10.3
1981	1,808,800	179,300	2,214,500	1.9	654,600	170,300	1,254,200	9.9	14.3	3.31	1.66	4.6	42½–24⅞	10.2
1980	1,740,400	239,300	1,925,800	1.7	524,800	130,900	1,193,800	13.7	20.0	4.45	1.56	4.2	45⅝–29⅛	8.4
1979	1,434,022	222,297	1,534,245	2.0	415,401	68,316	1,037,354	15.5	21.4	4.12	1.39	4.4	35¼–27½	7.6
G. D. Searle & Co.														
1982	$1,036,900	$140,400	$1,204,500	2.1	$377,800	$135,200	$599,700	13.5%	23.4%	$2.77	$0.52	1.4%	$45¼–28⅝	13.3
1981	942,300	130,900[i]	1,050,400	2.3	279,300	87,600	533,600	13.9	24.5	2.52[i]	0.52	1.7	35½–25⅛	12.0
1980	1,081,558	94,341[j]	1,089,920	1.4	249,695	66,961	508,844	8.7	18.5	1.78[j]	0.52	2.3	27⅝–17¼	12.6
1979	898,309	89,004[k]	1,099,383	1.9	212,972	49,253	456,358	9.9	19.5	1.68[k]	0.52	3.3	20–11½	9.4
SmithKline Beckman Corp.														
1982	$2,968,667	$455,157	$2,765,900	2.1	$971,302	$304,784	$1,749,407	15.3%	26.0%	$5.51	$2.39	3.5%	$77⅝–57⅜	12.3
1981	1,985,341	370,000	1,796,105	2.3	580,920	200,816	1,135,457	18.6	32.5	5.55	2.12	2.8	88⅜–[illegible]	13.7
1980	1,771,938	307,994	1,490,914	2.4	421,788	132,806	923,723	17.4	33.3	4.65	1.725	2.8	80⅞–43½	13.3
1979	1,351,145	[illegible] 937	1,150,250	2.3	289,847	93,494	667,468	17.3	35.0	3.85	1.32	2.6	63¼–38½	13.2
Squibb Corp.														
1982	$1,660,766	$153,636	$1,871,882	2.1	$511,821	$ 87,280	$1,037,989	9.3%	14.8%	$3.01	$1.28	3.2%	$50½–29	13.2
1981	1,523,911	41,098[l]	1,900,424	2.1	479,720	69,851	979,689	2.7	4.2	0.83[l]	1.215	3.8	37⅝–26⅝	38.7
1980	1,675,780	123,079[m]	1,858,270	2.3	600,895	89,032	964,504	7.3	12.8	2.58[m]	1.155	3.6	39¼–24⅜	12.4
1979	1,782,894	123,722	1,747,588	2.2	630,047	109,970	881,875	6.9	14.0	2.71	1.095	3.3	39¼–27	12.2
Sterling Drug														
1982	$1,796,153	$131,970	$1,297,989	2.6	$356,535	$80,068	$825,944	7.3%	16.0%	$2.17	$1.06	4.3%	$29½–19¾	11.4
1981	1,792,925	130,303	1,226,410	2.5	334,980	77,016	787,542	7.3	16.5	2.15	0.98	4.3	26⅛–19	10.5
1980	1,701,433	123,337	1,214,231	2.4	318,109	70,051	752,640	7.2	16.4	2.04	0.90	4.2	26⅞–16	10.5
1979	1,500,692	111,594	1,105,581	2.3	280,594	58,186	680,649	7.4	16.4	1.85	0.82	4.5	21⅜–15¼	9.9
Upjohn Co.														
1982	$1,828,730	$126,020	$2,013,985	1.9	$675,869	$137,273	$973,028	6.9%	13.0%	$4.18	$2.28	4.7%	$59⅜–38	11.6
1981	1,898,334	181,764	1,940,485	2.0	614,481	139,211	965,267	9.6	18.8	6.04	2.07	3.6	69–45⅝	9.5
1980	1,760,576	170,375	1,669,621	1.9	544,322	109,800	865,753	9.7	19.7	5.71	1.93	3.5	68–41½	9.6
1979	1,508,025	149,478	1,403,734	2.1	476,357	77,498	743,659	9.9	20.1	5.03	1.62	3.6	50½–40	9.0
Warner-Lambert Co.														
1982	$3,245,967	$174,970[n]	$2,344,259	1.9	$768,571	$153,507	$ 815,864	5.4%	21.4%	$2.20[n]	$1.40	5.6%	$30⅛–19⅝	11.3
1981	3,379,952	9,222[o]	2,662,418	1.7	869,753	165,833	1,084,796	0.3	0.9	0.12[o]	1.34	6.4	25–17⅛	175.5
1980	3,479,207	192,716[p]	2,638,077	2.1	827,131	138,688	1,171,477	5.5	16.5	2.41[p]	1.32	6.6	23¼–17	8.4
1979	3,217,208	123,346[q]	2,542,167	1.9	775,253	155,473	1,067,151	3.8	11.6	1.55[q]	1.29	5.8	26½–17⅜	14.3

a From continuing operations; excludes net loss from discontinued diagnostic imaging operations and provision for loss on disposal of discontinued operations of $52.4 million ($0.68 per share). b Fiscal year ends June 30. c From continuing operations; excludes net loss from discontinued ethical pharmaceutical businesses of $3.9 million ($0.16 per share). d Data for Richardson-Merrell prior to sale (in March 1981) of ethical pharmaceutical businesses to Dow Chemical Co. e Includes income, before taxes, from litigation settlement of $3.1 million. f Includes income, before taxes, from litigation settlement of $3.4 million. g Includes income, before taxes, from litigation settlement of $3.6 million and provision for net losses on disposition of businesses of $4.7 million ($0.19 per share). h Includes income, before taxes, from settlement of antitrust litigation of $28.9 million. i From continuing operations; excludes net loss from operations and disposition of discontinued businesses of $26.0 million ($0.50 per share) and debit for cumulative effect of changes in accounting principles of $6.2 million ($0.12 per share). j From continuing operations; excludes reserve for loss from sale of assets of diagnostic business of $9.0 million ($0.17 per share) and extraordinary tax credit of $13.0 million ($0.24 per share). k From continuing operations; excludes net loss from operations of divested diagnostic business of $1.1 million ($0.02 per share). l From continuing operations; excludes net gain on sale of confectionery products business of $58.1 million ($1.16 per share), net income from that business of $12.2 million ($0.24 per share), and extraordinary charge relating to takeover of operations in Iran of $6.5 million ($0.13 per share). m From continuing operations; excludes net income of divested food services and related operations of $4.3 million ($0.09 per share). n Includes nonrecurring net credit of $12 million ($0.15 per share). o Includes nonrecurring net charge of $134 million ($1.68 per share). p Includes nonrecurring net charge of $3 million ($0.03 per share). q Includes nonrecurring net charges and tax settlement of $64 million ($0.80 per share).

Productivity drops as capacity use stays low

Some of the most common measures of industrial efficiency look pretty bad for 1982. The sharp drop in the U.S. economy last year and the resulting drop in chemical output and plant use rates skewed everything.

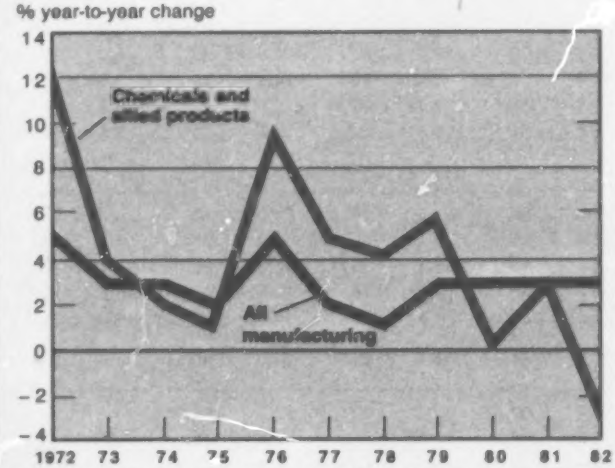
The odd result is that the chemical industry reversed its usual position, relative to manufacturing as a whole, in its labor productivity and unit labor costs. It was not quite so brutal as all manufacturing in slashing worktime and curbing wage gains in the face of the recessionary decline in production.

Production fell 9% in 1982 for the chemical industry and 8% for all manufacturing. But chemical companies cut total workhours per week just 6%, whereas all manufacturing sliced worktime 11%. And chemical companies still increased the wages of production people 9% in 1982, but all manufacturing gave only a 6% gain.

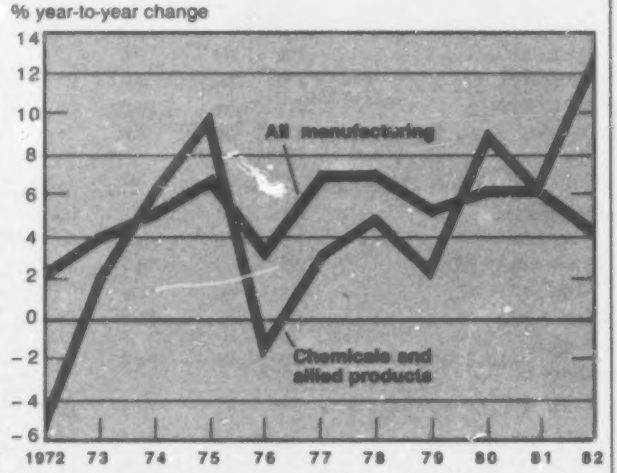
So productivity (output per workhour in production units) in chemical plants fell 3% in 1982—the first drop in at least 20 years—and unit labor costs (costs per unit of output) soared 13%. For all manufacturing, productivity gained 3% and unit labor costs did also.

Chemical plant use stayed very low all last year and is still low. For a sample of basic chemicals, C&EN semiannual surveys show that the combined use rate early in 1982 was just 60% of the nameplate maximum and climbed only to 63% early in 1983.

Productivity declines for chemicals . . .



. . . pushing unit labor costs up sharply



Note: Productivity is output per workhour, calculated by dividing indexes for production by indexes for workhours of production employees. Unit labor costs are labor costs per unit of output, calculated by dividing indexes for wages by indexes for output per workhour. **Sources:** Department of Labor, Federal Reserve Board, C&EN calculations

PRODUCTIVITY: For chemical firms, a slump last year after the previous year's modest gain

Indexes, 1967 = 100	1982	1981	1980	1979	1978	1977	1976	1975	1974	1973	1972
CHEMICALS & ALLIED PRODUCTS											
Production	196.1	215.6	207.1	211.8	197.4	185.7	170.9	147.2	159.4	154.4	143.6
Workhours	99.3	106.1	105.4	107.7	106.8	104.5	101.4	96.5	105.1	103.7	100.3
Productivity	197.5	203.2	196.5	196.7	184.8	177.7	168.5	152.5	151.7	148.9	143.2
Hourly production wages	321.9	294.2	267.7	245.2	226.5	207.4	190.7	173.9	157.4	145.5	137.4
Unit labor costs	163.0	144.8	136.2	124.7	122.6	116.7	113.2	114.0	103.8	97.7	95.9
ALL MANUFACTURING											
Production	138.6	150.4	146.7	153.6	146.8	138.4	130.3	116.3	129.4	129.8	118.9
Workhours	84.9	95.3	96.2	103.3	101.7	97.3	93.4	87.8	100.0	103.1	97.3
Productivity	163.3	157.8	152.5	148.7	144.3	142.2	139.5	132.5	129.2	125.9	122.2
Hourly production wages	300.4	282.3	256.9	236.7	218.0	200.7	185.1	171.3	156.7	145.0	135.5
Unit labor costs	184.0	178.9	168.5	159.2	151.1	141.1	132.7	129.3	121.1	115.2	110.9

Sources: Department of Labor, Federal Reserve Board, C&EN calculations

3 Efficiency in the U.S. Chemical Industry

OPERATING RATES: Use of chemical plant capacity remains very low

Billions of lb per year unless otherwise noted[a]	1ST-QTR 1983		3RD-QTR 1982		1ST-QTR 1982		3RD-QTR 1981		1ST-QTR 1981		3RD-QTR 1980	
	Capacity[b]	Use	Capacity[b]	Use	Capacity[b]	Use	Capacity[b]	Use	Capacity[b]	Use	Capacity[b]	Use
ORGANIC CHEMICALS												
Benzene (bg)	2.3	43%	2.4	48%	2.4	44%	2.7	67%	2.5	68%	2.4	64%
Butadiene[c]	4.5	37	4.4	40	4.6	42	4.6	67	4.6	61	4.0	65
Cyclohexane	3.4	31	3.1	37	3.1	33	3.4	59	3.4	62	3.4	52
DMT-TPA[d]	7.3	64	7.3	56	7.3	58	7.3	71	7.3	71	7.3	59
Ethylene	39.0	67	39.0	61	39.7	56	41.0	65	40.0	68	40.0	63
Formaldehyde, 37% solution	9.2	55	8.9	47	8.9	51	8.9	65	8.9	66	8.6	59
Methanol (bg)	1.7	56	1.6	76	1.5	72	1.4	83	1.4	90	1.4	80
Phenol	3.6	64	3.6	61	4.0	56	4.0	67	3.6	69	3.7	65
Propylene, chemical	23.0	49	23.0	56	23.0	44	23.5	59	23.5	58	23.8	48
Styrene	8.2	64	8.7	69	8.7	79	8.9	74	8.9	82	8.9	55
Urea	7.8	73	7.8	72	7.8	65	8.0	90	8.0	88	8.0	91
Vinyl acetate	2.4	90	2.3	91	2.4	72	2.4	79	2.5	78	2.5	68
Vinyl chloride	10.1	65	10.0	68	9.6	50	9.7	70	9.2	65	8.2	63
***p*-Xylene**	4.9	68	4.9	60	5.5	54	5.6	64	5.6	75	5.6	68
INORGANIC CHEMICALS												
Ammonia (mt)	18.7	71	19.8	82	19.8	84	24.0	80	24.0	83	24.0	75
Carbon black	3.3	63	3.4	62	3.4	75	3.4	82	3.7	76	3.7	61
Carbon dioxide (ttd)	18.9	61	18.4	67	17.7	63	16.4	71	15.6	69	15.6	68
Caustic soda (mt)	15.4	66	15.6	61	15.7	59	15.5	75	15.6	73	15.3	68
Chlorine (mt)	14.4	66	14.6	64	14.8	[illegible]	14.8	78	14.7	73	14.6	69
Nitrogen / **Oxygen** total, liquid (ttd)	37.0	64	36.6	65	37.6	64	36.0	66	34.8	63	33.6	69
Phosphoric acid, (P_2O_5) (mt)	12.5	71	12.6	64	12.4	62	11.5	91	11.7	94	11.7	87
Phosphorus (mt)	0.55	82	0.55	68	0.55	66	0.55	78	0.55	78	0.55	70
Soda ash (mt)	10.7	74	10.9	73	10.4	76	10.0	83	10.0	82	9.7	79
Sulfuric acid (mt)	57.5	59	59.6	49	59.4	54	58.5	74	58.3	74	58.0	76
Titanium dioxide (mt)	1.0	60	1.0	61	1.0	53	1.0	82	1.0	77	1.0	66
AVERAGE		**63%**		**62%**		**60%**		**74%**		**74%**		**68%**

a bg = billions of gallons, mt = millions of tons, ttd = thousands of tons per day. b Nameplate capacity. c Total extraction capacity, which runs about 25% more than basic production capacity. d Dimethyl terephthalate-purified terephthalic acid, not including acid converted to dimethyl terephthalate. **Sources:** Industry sources, C&EN estimates

Excess capacity increased in the chemical process industries last year

	Operating rate, % of nameplate capacity, as of December										
	1982	1981	1980	1979	1978	1977	1976	1975	1974	1973	1972
Chemicals	66%	70%	78%	83%	83%	76%	78%	78%	81%	88%	85%
Paper	79	83	89	91	89	87	85	85	84	93	91
Petroleum	69	73	80	86	91	91	93	91	90	95	94
Rubber	73	66	70	70	84	81	85	81	77	84	89
Textiles	74	75	80	82	85	87	84	85	69	89	91
All manufacturing	68	72	78	81	84	82	81	79	78	85	85

Source: Department of Commerce

ENERGY USE BY CHEMICAL INDUSTRY: Electricity and coal have been increasing their share

Energy source[a]	1982		1981		1980		1979		1972		Change 1972–82	
	Trillion Btu	% of total	Trillion Btu	% of total	Trillion Btu	% of total	Trillion Btu	% of total	Trillion Btu	% of total	Trillion Btu	%
Natural gas	1039	39.0%	1272	40.2%	1293	39.7%	1371	38.6%	1636	48.4%	−597	−36.5%
Purchased electricity[b]	790	29.7	931	29.4	943	29.0	998	28.1	718	21.3	72	10.0
Petroleum-based fuels	458	17.2	542	17.1	621	19.1	762	21.5	578	17.1	−120	−20.8
Light hydrocarbons[c]	321	12.1	351	11.1	380	11.7	433	12.2	322	9.5	−1	−0.3
Residual fuels	80	3.0	104	3.3	141	4.3	217	6.1	162	4.8	−82	−50.6
Distillate fuels	13	0.5	18	0.6	23	0.7	37	1.0	33	1.0	−20	−60.6
Other fuel[d]	44	1.6	70	2.2	77	2.4	75	2.1	61	1.8	−17	−27.9
Coal and coke	293	11.0	324	10.2	301	9.3	305	8.6	320	9.5	−27	−8.4
Purchased steam	82	3.1	98	3.1	95	2.9	115	3.2	123	3.7	−41	−33.3
TOTAL	2661	100.0%	3167	100.0%	3255	100.0%	3550	100.0%	3376	100.0%	−715	−21.2%

a For energy and process use only, excluding energy equivalent of feedstock. b Electricity is calculated as fuel value of 10,000 Btu to generate 1 kWh instead of using standard conversion factor of 3412 Btu per kWh. c Includes propane, liquefied petroleum gas, and other gases. d Includes petroleum coke, gasoline, and other liquids and solids. **Note:** Data from companies accounting for about 90% of U.S. capacity for basic industrial chemicals. **Source:** Chemical Manufacturers Association

ENERGY USE BY FERTILIZER INDUSTRY: Natural gas provides more than three quarters

Energy source[a]	1982		1981		1980		1979[b]		1972		Change 1972–82	
	Trillion Btu	% of total	Trillion Btu	% of total	Trillion Btu	% of total	Trillion Btu	% of total	Trillion Btu	% of total	Trillion Btu	%
Natural gas	151.8	76.8%	200.6	81.2%	205.0	79.3%	206.1	77.9%	161.3	79.3%	−9.5	−5.9%
Purchased electricity[c]	33.7	17.1	43.7	17.7	46.9	18.2	49.2	18.6	35.3	17.4	−1.6	−4.5
Petroleum-based fuels	4.4	2.3	1.8	0.7	5.8	2.2	8.6	3.3	6.2	3.1	−1.8	−29.0
Residual fuels	4.4	2.2	1.0	0.4	4.5	1.7	5.4	2.0	3.8	1.9	0.6	15.8
Distillate fuels	na	na	0.7	0.3	0.7	0.3	2.7	1.0	2.2	1.1	na	na
Other fuel[d]	0	0	0.2	0.1	0.6	0.2	0.6	0.2	0.2	0.1	0.2	−100
Coal and coke	na	na	0.5	0.2	0.6	0.2	0.5	0.2	0.5	0.2	na	na
Generated steam[e]	7.6	3.8	na	na	na	na	na	na	na	na	na	na
Purchased steam	0	0	0.4	0.1	0.2	0.1	0.2	0.1	0.1	0	−0.1	100
TOTAL	197.6	100.0%	246.9	99.9%	258.5	100.0%	264.6	100.1%	203.3	100.0%	−5.7	−2.8%

a For energy and process use only, excluding energy equivalent of feedstock. b Figures for 1979 include 18 companies (with total energy consumption of 209 trillion Btu) that use 1972 as a reference base and four companies (with total energy consumption of 56 trillion Btu) that use 1978 as a reference base instead; 1979 figures thus are not completely comparable to other years. c Electricity is calculated as fuel value of 10,000 Btu to generate 1 kWh instead of using standard conversion factor of 3412 Btu per kWh. d Includes propane, liquefied petroleum gas, gasoline, diesel oil, kerosene, and other fuels. e Steam generated from fossil fuel, listed prior to 1982 under residual fuels, distillate fuels, other fuel, and coal and coke. na = not available. **Note:** Data from companies accounting for more than 70% of U.S. fertilizer capacity. **Source:** Fertilizer Institute

ENERGY USE BY PETROLEUM INDUSTRY: Share provided by natural gas is shrinking

Energy source[a]	1982		1981		1980		1979		1972		Change 1972–81	
	Trillion Btu	% of total	Trillion Btu	% of total	Trillion Btu	% of total	Trillion Btu	% of total	Trillion Btu	% of total	Trillion Btu	%
Natural gas	591	22.4%	686	24.7%	734	25.1%	758	25.0%	995	33.5%	−404	−40.6%
Purchased electricity[b]	242	9.1	250	9.0	253	8.6	242	8.0	194	6.5	48	24.7
Petroleum-based fuels	1781	67.5	1810	65.1	1903	65.1	1989	65.7	1745	58.7	36	2.1
Light hydrocarbons[c]	1189	45.0	1194	43.0	1243	42.5	1291	42.7	1041	35.0	148	14.2
Residual fuels	149	5.6	177	6.4	215	7.3	234	7.7	246	8.3	−97	−39.4
Petroleum coke	429	16.2	428	15.4	425	14.5	431	14.3	432	14.5	−3	−0.7
Other fuel[d]	15	0.5	11	0.4	19	0.7	33	1.1	26	0.9	−11	−42.3
Coal and coke	8	0.2	5	0.2	4	0.1	5	0.2	5	0.2	1	20.0
Purchased steam	20	0.8	28	1.0	31	1.1	32	1.1	34	1.1	−14	−41.2
TOTAL	2640	100.0%	2779	100.0%	2925	100.0%	3026	100.0%	2979	100.0%	−333	−11.2

a For energy and process use only, excluding energy equivalent of feedstock. b Electricity is calculated as fuel value of 10,000 Btu to generate 1 kWh instead of using standard conversion factor of 3412 Btu per kWh. c Includes propane, liquefied petroleum gas, and refinery gas. d Includes distillate fuels, gasoline, and other liquids. **Note:** Data from companies accounting for about 90% of U.S. petroleum refining capacity, including Puerto Rico. **Source:** American Petroleum Institute

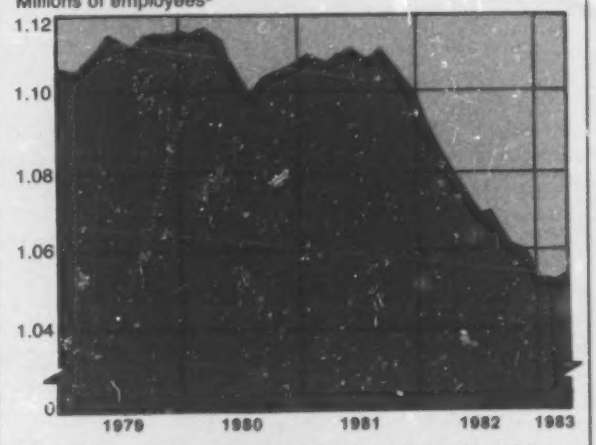
4 Employment in the U.S. Chemical Industry

Chemical companies sharply cut workforce

The number of workers in the U.S. chemical industry dropped throughout last year. And although the decline in employment apparently bottomed out early this year at about 1,050,000—the lowest level since late 1976—the industry cut its workforce more than 60,000 (nearly 6%), on a seasonally adjusted basis, since September 1981. About three quarters of the lost jobs have been among production or nonsupervisory workers in chemical plants. The most severe cutbacks have been made in plants that produce plastics and fibers or agricultural chemicals, where the drop in total employment during 1982 was about 8%.

Faced with lower demand and the need to slice operating costs, nearly all the major U.S. chemical producers have trimmed employment, with some of the larger firms cutting 5000 or more jobs. For several companies, in fact, among them Celanese, Monsanto, and Union Carbide, total employment now is less than it was a decade ago.

Employment in chemical production fell steadily throughout 1982



a Seasonally adjusted employment in U.S. chemicals and allied products industry; March and April 1983 figures are preliminary. **Source:** Department of Labor

INDUSTRIAL EMPLOYMENT: Lower throughout most of the chemical industry last year

	All employees[a] (thousands)				Production workers[a] (thousands)				Workweek[a,b] (hours)			
	1982	1981	1980	1972	1982	1981	1980	1972	1982	1981	1980	1972
All manufacturing	18,848	20,173	20,285	9151	12,782	14,021	14,214	14,045	38.9	39.8	39.7	40.5
Chemicals and allied products	1,074	1,107	1,107	1009	597	627	626	593	40.9	41.6	41.5	41.7
Industrial inorganic chemicals	154	160	161	141	82	87	87	87	40.4	41.5	41.5	42.0
Plastics materials and synthetics	183	195	205	229	118	129	137	149	40.6	42.0	41.4	42.0
Drugs	200	199	196	159	98	99	97	81	41.1	41.1	41.0	40.9
Soap, cleaners, and toilet goods	145	146	141	122	91	91	86	71	40.7	40.4	40.5	40.8
Paints and allied products	60	63	65	69	29	31	33	38	39.6	40.4	40.3	41.3
Industrial organic chemicals	174	179	174	143	88	90	88	78	41.9	42.8	42.8	42.1
Agricultural chemicals	67	71	72	56	41	44	45	36	42.0	43.0	43.4	42.4
Miscellaneous chemical products	92	95	93	90	51	54	53	54	40.5	41.3	41.0	41.4
Petroleum and coal products	207	216	198	195	124	135	125	125	43.9	43.2	41.8	42.7
Rubber and miscellaneous plastics products	698	736	727	630	535	569	559	495	39.6	40.3	40.0	41.1

a Domestic employment. b Workweek of production or nonsupervisory workers. **Source:** Department of Labor

EMPLOYMENT OF SCIENTISTS, ENGINEERS: More work with drugs than industrial chemicals

Thousands[a]	1982[b]	1981	1980	1979	1978	1977	1976	1975	1974	1973	1972
Total, all industry	511.6	487.8	460.0	423.9	404.4	382.8	364.4	363.3	360.0	357.7	350.2
Chemicals and allied products	60.0	54.7	51.4	50.0	48.3	46.4	44.4	45.2	41.8	40.9	41.0
Industrial chemicals	24.3	21.6	20.9	21.4	21.3	20.6	20.1	21.1	19.1	19.1	19.1
Drugs and medicines	25.3	23.3	21.6	20.7	19.5	17.8	16.6	15.6	14.0	13.0	13.1
Other chemicals	10.4	9.8	8.9	7.9	7.5	8.0	7.8	8.5	8.7	8.8	8.8
Petroleum refining	15.9	13.0	10.8	10.1	9.9	8.9	8.6	8.4	8.2	8.2	8.3
Rubber products	na	na	na	8.1	7.9	9.1	8.6	8.4	7.7	7.5	6.7

a Full-time-equivalent number of R&D scientists and engineers in industry, as of January of each year. b Preliminary. na = not available. **Source:** National Science Foundation

CHEMICAL EMPLOYMENT: Companies trim their workforces for the second year in a row

Thousands	1982	1981	1980	1979	1978	1977	1976	1975	1974	1973
Air Products	18.9	16.2	15.8	14.6	14.3	13.7	13.4	13.0	13.0	10.3
American Cyanamid	40.2	41.8	42.6	44.2	44.0	43.8	39.4	37.8	38.0	39.5
Celanese	36.7	35.9	36.5	33.3	33.2	32.1	31.9	37.0	38.8	37.4
Crompton & Knowles	2.3	2.5	2.8	3.0	3.2	3.1	3.0	2.2	2.4	2.5
Dow Chemical	56.6	63.8	56.8	55.9	53.5	53.2	53.0	53.0	53.3	49.8
Ethyl	14.0	14.5	15.0	16.0	16.5	16.0	16.0	17.0	18.0	14.0
FMC	33.9	38.9	39.0	41.0	40.4	37.9	33.2	33.2	34.1	31.7
Freeport-McMoRan	5.0	5.2	2.7	3.9	3.5	3.7	3.8	3.5	3.3	2.9
H. B. Fuller	4.0	3.3	3.4	3.4	3.3	3.0	2.8	2.6	2.3	2.1
W. R. Grace	82.2	89.0	91.7	82.1	68.5	68.7	63.8	65.3	79.1	75.7
Hercules	21.6	22.8	22.9	24.4	24.5	24.0	24.0	23.5	25.3	24.1
International Flavors	3.6	3.6	3.6	3.6	3.5	3.3	3.1	2.9	3.1	2.8
International Minerals	8.4	10.6	10.5	10.3	9.9	9.9	9.7	10.5	6.6	6.2
Lubrizol	4.3	4.2	4.2	3.9	3.8	3.6	3.6	3.6	3.5	3.3
Monsanto	52.2	57.4	61.8	63.9	62.9	61.5	61.9	59.2	60.9	58.3
Nalco Chemical	4.6	4.7	4.4	4.1	4.1	4.2	3.8	3.5	3.4	3.2
Olin	17.5	20.3	21.0	21.7	22.7	22.4	22.0	23.0	23.0	24.0
Pennwalt	9.5	10.7	12.6	13.3	14.0	13.9	13.9	14.3	14.8	13.9
Reichhold Chemicals	4.5	5.6	5.6	6.4	6.5	6.5	5.8	4.3	4.1	4.3
Rohm & Haas	11.5	13.5	13.2	13.3	13.1	13.0	13.3	13.8	14.2	13.5
Stauffer Chemical	11.0	12.2	13.4	13.8	13.1	13.0	13.0	13.1	12.5	12.0
Stepan Chemical	0.9	0.9	0.8	0.9	0.8	0.8	0.7	0.7	0.8	0.7
Union Carbide	103.2	110.3	116.1	115.8	113.4	113.7	113.1	106.5	109.6	109.4
TOTAL EMPLOYEES	**546.6**	**587.9**	**595.5**	**594.8**	**576.8**	**565.0**	**548.6**	**543.7**	**564.1**	**541.7**
ANNUAL CHANGE	**−7.0%**	**−1.3%**	**0.1%**	**3.1%**	**2.1%**	**3.0%**	**0.9%**	**−3.6%**	**4.1%**	**1.6%**
SALES PER EMPLOYEE ($ thousands, current)	**$109.4**	**$110.5**	**$103.5**	**$94.9**	**$89.8**	**$73.8**	**$68.5**	**$51.2**	**$57.3**	**$44.4**
SALES PER EMPLOYEE ($ thousands, constant 1972[a])	**$ 39.0**	**$ 40.0**	**$ 41.4**	**$44.5**	**$47.0**	**$39.9**	**$38.1**	**$29.4**	**$54.3**	**$42.0**

a Based on price index for chemicals and allied products. **Note:** Data for years prior to 1981 are not restated for acquisitions and similar adjustments.

WAGES: Workers making industrial chemicals earn more than those in other chemical areas

	Hourly earnings[a]				Weekly earnings[a]			
	1982	1981	1980	1972	1982	1981	1980	1972
All manufacturing	$ 8.50	$ 7.99	$ 7.27	$3.82	$330.65	$318.00	$286.62	$154.71
Chemicals and allied products	9.98	9.12	8.30	4.26	408.18	379.39	344.45	177.64
Industrial inorganic chemicals	11.04	10.16	9.07	4.58	446.02	421.64	376.41	192.36
Plastics materials and synthetics	9.87	9.01	8.21	4.08	400.72	378.42	339.89	171.36
Drugs	9.12	8.30	7.69	4.08	374.83	341.13	315.29	166.87
Soap, cleaners, and toilet goods	9.17	8.39	7.67	4.15	373.22	338.96	310.64	169.32
Paints and allied products	8.80	8.03	7.39	3.98	348.43	324.41	297.82	164.37
Industrial organic chemicals	11.85	10.72	9.67	4.93	496.52	458.82	413.88	207.55
Agricultural chemicals	9.68	8.89	8.12	3.85	406.56	382.27	352.41	163.24
Miscellaneous chemical products	9.22	8.44	7.75	4.09	373.41	348.57	317.75	169.33
Petroleum and coal products	12.46	11.38	10.10	4.96	546.99	491.62	422.18	211.79
Rubber and miscellaneous plastics products	7.63	7.16	6.52	3.61	302.15	288.55	260.80	148.37

a For production and nonsupervisory workers in domestic employment. **Source:** Department of Labor

5 **Foreign Trade**

World trade in chemicals slumps

World chemical trade last year responded to a world in recession by dropping 11% in dollar value. It was the second consecutive year in which world chemical trade, measured as exports, has declined. This is unprecedented in the post-World War II era. Since 1980, when world chemical exports hit their peak of $147 billion, they have slipped 16% to $125 billion last year. No major chemical exporting country has escaped. The U.S., Canada, Japan, Switzerland, and all of the major countries of the European Economic Community saw shipments to other nations decline from 1 to 18%.

For the U.S., the overall trade balance slipped further into the red as exports dropped 9% to $212 billion and imports went down only 7% to $244 billion. The result was a trade deficit of almost $32 billion, compared to a deficit of $27 billion in 1981. This rising trade deficit has trade officials concerned because it comes despite the fact that imports of oil, natural gas, and related products fell $18 billion last year.

Equally worrisome are the declines in the net U.S. trade position for machinery and equipment, agricultural products, textiles, and chemicals. Part of last year's problem was lower demand in major U.S. export markets, not only in the recession-laden industrialized countries, but in heavily indebted developing nations such as Mexico and Brazil. The other part was a strong U.S. dollar.

Nowhere is this more evident than in U.S. chemical trade. Chemical exports dropped 6% to $19.9 billion, while imports, despite a weak U.S. economy, managed to scratch out a gain of less than 1% to $9.5 billion. As a result, the chemical industry's trade surplus, which had reached an all-time high of $12 billion in 1980, slipped for the second consecutive year to $10.4 billion.

Very few chemical product areas came through 1982 without losing export markets. The most notable exception was medicinals and pharmaceuticals, exports of which increased 5% to $2.3 billion.

U.S. TOTAL TRADE BALANCE:

Drop in exports brings a bigger deficit

$ Billions	1982	1981	1980	1972
Exports[a]	$212.2	$233.7	$200.6	$49.6
Imports[b]	244.0	261.0	244.9	55.6
Trade balance	−31.8	−27.3	−24.3	−6.4

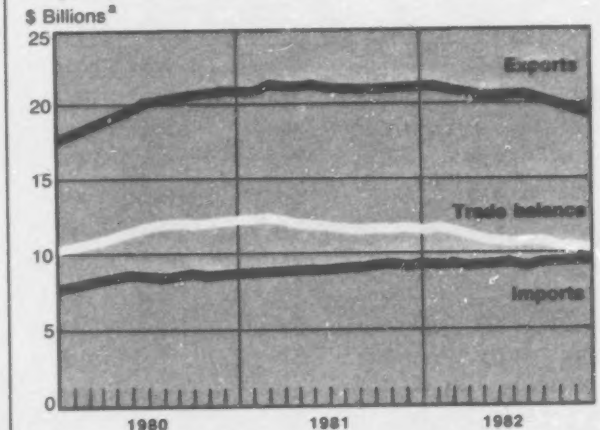
U.S. CHEMICAL TRADE BALANCE:

Surplus shrinks for second year in a row

$ Millions	1982	1981	1980	1972
Chemical exports[c]	$19,891	$21,187	$20,740	$4,134
Chemical imports[b]	9,494	9,446	8,594	2,015
Chemical trade balance	10,397	11,741	12,146	2,119

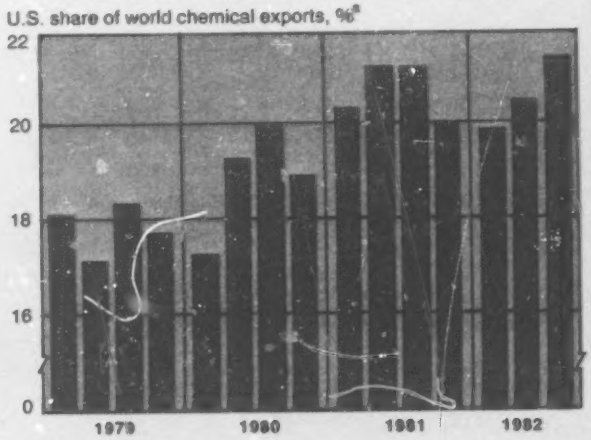
a Exports of domestic and foreign merchandise, excluding Department of Defense and Grant-Aid shipments; FAS (free along ship) value. b Customs value, except 1972, which is foreign value. c Excludes foreign re-exports. **Source:** Department of Commerce

Export fall cuts chemical trade balance . . .



a Running 12-month values for U.S. chemical exports, imports, and trade balance. **Source:** Department of Commerce

. . . but U.S. holds its share of world market



a U.S. chemical exports as a percentage of chemical exports from 15 major industrial nations, excluding exports to the U.S. **Source:** Department of Commerce

WORLD TRADE: Chemical exports drop

$ Millions	1982	1981	1980	1972
CHEMICAL EXPORTS				
World	$124,500[a]	$139,300[a]	$147,392	$29,137
U.S.	19,891	21,187	20,740	4,134
Canada	3,475	4,002	3,519	639
EC, 10 countries[b]	60,770	69,452	76,710	15,718
Belgium-Luxembourg	5,925	6,477	7,422	1,564
France	9,937	12,141	13,249	2,428
Italy	4,310	5,214	5,505	1,222
Netherlands	9,274	10,418	11,288	2,338
U.K.	8,872	10,831	12,303	2,404
West Germany	19,994	21,966	24,318	5,416
Switzerland	5,440	5,505	5,680	1,525
Japan	6,365	6,841	6,767	1,784
CHEMICAL IMPORTS				
U.S.	9,494	9,446	8,594	2,015
Canada	3,262	3,569	3,249	1,001
EC, 10 countries[b]	48,852	51,483	57,075	11,152
Belgium-Luxembourg	4,972	5,235	5,972	1,213
France	9,889	10,376	12,169	2,185
Italy	6,896	7,020	7,993	1,564
Netherlands	5,378	5,726	6,393	1,356
U.K.	6,427	7,260	7,310	1,630
West Germany	11,824	12,201	13,314	2,509
Switzerland	3,208	3,226	3,648	833
Japan	6,824	6,487	6,202	1,148

a C&EN estimates. b European Communities; historical data have been adjusted to reflect present 10 members. **Sources:** United Nations, Organization for Economic Cooperation & Development, European Communities, individual country data

U.S. TRADE: Europe takes less, ships more

$ Millions	1982	1981	1980	1972
U.S. CHEMICAL EXPORTS				
Canada	$ 2,183	$ 2,478	$ 2,134	$ 693
Western Europe	5,940	6,155	6,429	1447
Eastern Europe	366	347	88	33
Communist Asia	497	406	386	2
Japan	2,530	2,349	1,964	313
Rest of Asia	2,600	2,597	2,782	348
Middle East	533	517	459	80
Latin America	3,670	4,469	4,846	908
Australasia	655	778	645	128
Africa	524	642	721	108
Other	393	449	286	74
TOTAL	**$19,891**	**$21,187**	**$20,740**	**$4134**
U.S. CHEMICAL IMPORTS				
Canada	$2596	$2916	$2494	$ 439
Western Europe	4174	3931	3953	940
Eastern Europe	151	131	195	15
Communist Asia	136	126	107	2
Japan	879	956	697	250
Rest of Asia	220	197	163	26
Middle East	99	110	58	11
Latin America	613	669	536	82
Australasia	286	186	206	99
Africa	225	117	62	17
Other	115	107	123	134
TOTAL	**$9494**	**$9446**	**$8594**	**$2015**

Source: Department of Commerce

U.S. TRADE, BY-PRODUCTS: Exports slump for most categories

$ Millions	Chemical exports[a]				Chemical imports[b]			
	1982	1981	1980	1972[c]	1982	1981	1980	1972[c]
Organic chemicals	$ 5,440	$ 5,929	$ 5,697	$1134	$2960	$2974	$2541	$ 517
Inorganic chemicals	1,969	2,286	2,106	414	1502	1573	1324	426
Radioactive and associated materials	1,132	988	833	181	1143	786	990	110
Dyeing, tanning, and coloring materials	162	175	186	57	213	226	195	114
Pigments, paints, and varnishes	332	349	304	100	103	102	89	16
Medicinals and pharmaceuticals	2,275	2,165	1,932	474	563	583	509	149
Flavors, perfumes, cosmetics, and toiletries	514	535	479	102	295	289	302	100
Cleaning and polishing materials	324	396	327	93	76	74	72	14
Fertilizers, manufactured	1,386	1,735	2,265	298	963	1181	1105	232
Explosives and pyrotechnics	90	90	87	28	67	61	59	21
Plastics and resins	3,650	3,809	3,884	696	766	780	647	177
Pesticides and disinfectants	607	544	553	d	265	283	264	d
Miscellaneous chemical products	2,010	2,187	2,087	556	579	534	497	140
TOTAL	**$19,891**	**$21,187**	**$20,740**	**$4134**	**$9494**	**$9446**	**$8594**	**$2015**

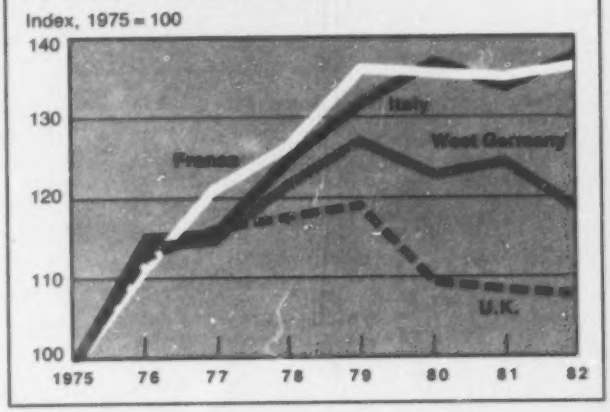
a Exports of domestic merchandise; FAS (free alongside ship) value. b General imports, FAS value. c As a result of statistical reclassification, data prior to 1978 are not comparable to those of subsequent years; C&EN has rearranged earlier data to make them as comparable as possible. d Included in miscellaneous. **Source:** Department of Commerce

6 Foreign Chemical Industries Western Europe

The chemical industry in Western Europe went through a difficult time in 1982. Demand was slack, competition keen, and selling prices under continued pressure. And production, where it was not actually below the previous year's level, generally was little changed.

As a result, financial results of the major West European chemical firms frequently were grim. Not necessarily as grim as the following statistics may suggest, however. Because all West European currencies continued to weaken against the U.S. dollar, translating monetary figures from local currency to dollars tends to penalize 1982 results relative to earlier years. In fact, only three of the 18 companies reported on page 58— Akzo, DSM, and Fisons—actually had lower sales, measured in local currency. And although most cut capital spending, outlays for R&D were higher all around.

Chemical production staggers in U.K., West Germany



CHEMICAL INDUSTRY TRENDS: Lower dollar values reflect recession and strong U.S. currency

$ Billions (U.S.)	1982	1981	1980	1979	1978
WEST GERMANY					
Sales	$48.5	$51.6	$59.2	$56.0	$44.6
Exports	22.9	23.8	26.0	24.0	18.4
Imports	13.0	13.3	14.6	13.2	9.5
Capital spending	2.8	3.1	3.8	3.3	2.8
Production index (1975 = 100)	117.4	124.6	122.7	127.9	121.3
Price index (1975 = 100)	130.1	125.2	115.2	106.8	99.2
Employees (thousands)	559	548	550	547	548
U.K.[a]					
Sales	$28.2	$37.6	$41.0	$35.6	$27.6
Exports	11.5	12.3	12.3	10.4	8.1
Imports	8.2	7.9	7.3	7.2	5.3
Capital spending	1.9	2.5	3.2	2.5	2.1
Production index (1975 = 100)	107.9	108.3	109.1	119.2	117.6
Price index (1975 = 100)	216.3	203.3	191.1	165.1	146.7
Employees (thousands)	338	395	430	441	439
FRANCE[a]					
Sales	$30.4	$33.4	$37.3	$32.9	$24.7
Exports	11.2	11.9	13.0	11.5	8.2
Imports	9.1	9.2	10.4	8.9	6.7
Capital spending	1.1	1.2	1.6	1.4	1.1
Production index (1975 = 100)	136.6	135.1	136.0	136.8	126.3
Price index (1975 = 100)	204.6	192.1	159.6	134.1	116.2
Employees (thousands)	286	289	296	301	306
ITALY					
Sales	$22.7	$24.1	$28.7	$23.7	$17.9
Exports	5.0	5.6	5.9	5.2	3.9
Imports	7.4	7.8	9.0	7.9	5.4
Capital spending	1.1	1.1	1.9	1.7	1.3
Production index (1975 = 100)	137.8	133.5	137.5	132.6	125.0
Price index (1975 = 100)	242.6	218.7	195.4	162.0	131.8
Employees (thousands)	260	271	289	291	292
BELGIUM					
Sales	$14.1	$15.3	$16.8	$14.4	$10.0
Exports	8.9	9.2	10.4	9.3	7.2
Imports	6.3	6.4	7.5	6.8	5.0
Capital spending	0.3	0.4	0.5	0.5	0.5
Production index (1975 = 100)	131.7	129.7	125.4	133.4	123.4
Price index (1975 = 100)	152.6	134.1	121.1	107.1	104.2
Employees (thousands)	88	88	90	82	89

$ Billions (U.S.)	1982	1981	1980	1979	1978
NETHERLANDS					
Sales	$12.5	$13.6	$14.3	$13.5	$10.0
Exports	11.3	11.9	13.0	11.8	8.6
Imports	6.7	7.1	7.9	7.0	5.1
Capital spending	0.6	0.6	0.7	0.6	0.8
Production index (1975 = 100)	131.0	133.0	130.0	136.0	124.0
Price index (1975 = 100)	140.0	143.0	125.0	114.0	103.0
Employees (thousands)	90	91	91	92	94
SPAIN					
Sales	$15.2	$15.7	$17.3	$15.4	$11.1
Exports	2.2	2.3	2.5	2.0	1.2
Imports	2.9	3.1	3.5	3.1	2.1
Capital spending	0.4	0.4	0.7	0.6	0.4
Production index (1975 = 100)	132.2	128.5	132.3	135.0	na
Price index (1975 = 100)	258.5	232.5	202.0	167.0	na
Employees (thousands)	243	244	244	245	215
SWITZERLAND					
Sales	$6.6	$6.7	$6.8	$6.6	$6.0
Exports	5.4	5.4	5.6	5.3	4.7
Imports	3.3	3.3	3.7	3.2	2.4
Production index (1975 = 100)	135.5	137.1	130.5	128.4	123.1
Price index (1975 = 100)	103.6	101.8	97.0	90.7	89.1
Employees (thousands)	na	63	62	62	62
SWEDEN					
Sales	$4.0	$4.1	$4.3	$3.9	$3.0
Exports	1.6	1.6	1.7	1.5	1.2
Imports	2.6	2.5	2.9	2.7	2.0
Capital spending	0.3	0.3	0.4	0.4	0.3
Production index (1975 = 100)	123.4	108.0	106.3	111.3	108.2
Price index (1975 = 100)	184.8	167.6	154.0	134.0	118.0
Employees (thousands)	44	41	39	40	40
NORWAY					
Sales	$2.0	$1.9	$2.1	na	na
Exports	1.0	1.5	1.2	$0.9	$0.7
Imports	0.9	1.0	1.1	1.0	0.8
Capital spending	0.1	0.1	0.2	0.1	0.3
Production index (1975 = 100)	121.4	122	120	118	102
Price index (1975 = 100)	191	141	131	116	103
Employees	18	17	17	17	17

a Excludes fibers. na = not available. Sources: National chemical federations and Conseil Européen des Fédérations de l'Industrie Chimique

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MAN-MADE FIBERS: Output dropped last year throughout almost all of Western Europe

Millions of lb	1982		1981		1980		1979		1978		Change, 1981–82	
	Non-cellulosics[a]	Cellulosics	Non-cellulosics[a]	Cellulosics	Non-cellulosics[a]	Cellulosics	Non-cellulosics[a]	Cellulosics	Non-cellulosics[a]	Cellulosics	Non-cellulosics	Cellulosics
West Germany	1589	314	1735	322	1619	304	1725	295	1649	293	−8%	−2%
Italy	1090[b]	102	1115[b]	133	896[b]	144	988	156	952	190	−2	−23
Spain	507	95	518	111	452	116	466	128	416	133	−2	−14
U.K.	506[c]	265[d]	612[c]	298[d]	700[c]	364[d]	838	504	885	472	−17	−11
France	436	100	444	119	423	146	493	169	542	163	−2	−16
Benelux countries	193	124	228	144	230	148	286	165	306	165	−15	−14
Switzerland	184	0	197	0	186	4	185	7	194	9	−7	—
Ireland	115	0	110	0	92	0	86	0	68	0	5	—
Portugal	na	na	75	9	67	6	68	7	62	5	—	—
Austria	51	251	53	257	56	255	62	242	67	236	−4	−2

a Excludes polypropylene filament unless otherwise indicated. b Includes polypropylene filament. c Includes cellulose acetate filament. d Excludes cellulose acetate filament. na = not available.
Source: Comité International de la Rayonne et des Fibres Synthétiques

PRODUCTION: Volume fell last year more often than it rose

Millions of lb	1982	1981	1980	1979	Change 1981–82
FRANCE					
Sulfuric acid	8858	9917	10,894	10,905	−11%
Hydrochloric acid	1514	1544	1,487	1,575	−2
Phosphoric acid	458	400	445	417	15
Chlorine	2759	2711	2,765	2,829	2
Sodium hydroxide	2939	2893	2,946	3,100	2
Ammonia	4180	4950	4,587	4,730	−16
Benzene	1133	1100	1,204	1,392	3
Toluene	89	124	140	190	−44
Xylenes	113	251	172	228	−55
Ethylene	4112	4085	4,561	4,946	1
Propylene	2277	2212	2,174	2,543	3
Butadiene	569	586	572	659	−3
Acetone	241	234	218	271	3
Formaldehyde	175	220	254	309	−20
Methanol	753	765	757	777	−2
Polyethylenes	1938	1944	2,364	2,560	0
Polypropylene	692	656	464	444	5
Polystyrene	680	577	559	590	18
Polyvinyl chloride	1729	1563	1,596	1,722	11
Synthetic rubber	1045	1070	1,124	1,091	−3
Phosphate fertilizers (P_2O_5)	2447	2590	2,965	2,999	−6
ITALY					
Sulfuric acid	5153	5597	6,220	6,502	−8%
Nitric acid	2203	2212	2,232	2,353	0
Phosphoric acid	936	979	1,044	1,985	−4
Chlorine	1569	1556	1,821	1,907	1
Sodium hydroxide	1854	1857	2,097	2,169	0
Ammonia	2769	3239	3,770	3,901	−15
Benzene	864	932	989	1,165	−7
Toluene	592	613	631	807	−3
Xylenes	590	564	625	713	5
Ethylene	2006	2011	2,364	2,598	0
Propylene	1024	1083	1,426	1,490	−5
Butadiene	349	366	403	365	−5
Phthalic anhydride	300	309	310	338	−3
Formaldehyde	228	240	288	296	−5
Polyethylenes	1157	1223	1,645	1,609	−5
Polystyrene	678	637	714	747	6
Polyvinyl chloride	1214	1282	1,480	1,534	−5
Synthetic rubber	478	535	569	640	−11
U.K.					
Sulfuric acid	5688	6360	7,440	7,692	−11%
Hydrochloric acid[a]	264	257	302	347	3
Nitric acid	6784	6541	6,215	6,399	4
Chlorine	1944	1916	2,004	2,262	1
Benzene	1377	1799	1,978	2,523	−23
Toluene	372	394	374	646	−6
Ethylene	2376	2718	2,409	2,714	−13
Propylene	1705	1621	1,260	1,685	5
Butadiene	516	457	422	500	13
Acetone	293	245	270	323	20
Ethanol	404	353	353	na	14
Formaldehyde	236	249	273	303	−5
Phenol	301	241	310	392	25
Phthalic anhydride	161	134	101	207	20
Thermoplastics	3044	2889	2,911	3,659	5
Polyethylenes	916	1000	957	1,069	−8
Polypropylene	486	435	418	581	12
Polystyrene	298	316	345	466	−6
Polyvinyl chloride	779	693	770	957	12
Synthetic rubber	419	418	466	611	0
Nitrogen fertilizers (N)[a]	2708	2837	2,552	2,973	−5
Phosphate fertilizers (P_2O_5)[a]	725	741	764	1,001	−2
WEST GERMANY					
Sulfuric acid	8334	9018	9,054	9,440	−8%
Hydrochloric acid	1865	1953	1,960	2,080	−5
Nitric acid	5040	6356	6,994	6,912	−21
Chlorine	6253	6629	6,592	7,044	−6
Sodium hydroxide	6318	6687	6,595	7,082	−6
Sodium sulfate	472	561	496	464	−16
Sodium carbonate	2432	2616	3,104	3,082	−7
Ammonia	3454	4316	4,496	4,755	−20
Ammonium carbonate	2432	2616	3,104	3,082	−7
Benzene	2258	2027	2,022	2,214	11
Toluene	590	578	573	657	2
Xylenes	1012	1071	783	1,085	−6
Ethylene	5808	6357	6,744	7,807	−9
Propylene	3259	3550	3,501	4,057	−8
Ethylene oxide	866	955	847	966	−9
Ethylene glycol	404	487	459	559	−17
Acetaldehyde	571	670	736	892	−15
Acetic acid	562	646	631	758	−13
Ethanol	220	222	238	226	−1
Formaldehyde	1070	1117	1,059	1,075	−4
Methanol	1559	1524	1,810	1,916	2
Phthalic anhydride	439	474	494	588	−7
Polyethylenes	2473	2639	3,080	3,472	−6
Polyvinyl chloride	1902	2021	2,097	2,387	−6
Synthetic rubber	844	873	958	921	−3
Nitrogen fertilizers (N)	1464	2191	2,449	2,144	−33
Phosphate fertilizers (P_2O_5)	595	732	841	774	−19

a Manufacturers' sales. Sources: Government agencies for each country

COMPANY RESULTS: Despite recession some firms bolstered earnings last year

$ Millions	Net sales	Net income	Profit margin	Capital spending	R&D spending	Employees (thousands)
Hoechst (West Germany)						
1982	$14,397.5	$130.5	0.9%	$ 850.6	$642.4	182.2
1981	15,236.7	188.5	1.2	870.4	670.4	184.7
1980	16,436.8	305.5	1.9	1053.8	714.8	186.9
1979	14,797.8	355.2	2.4	893.4	624.0	182.7
Bayer (West Germany)						
1982	$14,335.0	$ 26.3	0.2%	$ 846.9	$637.9	179.4
1981	14,930.1	228.8	1.5	1123.5	822.1	180.9
1980	15,837.9	401.1	2.5	1461.0	681.9	181.6
1979	14,208.7	237.7	1.7	1224.0	603.3	181.0
BASF (West Germany)						
1982	$13,368.7	$113.2	0.8%	$ 824.3	$483.1	115.9
1981	14,055.8	162.4	1.2	911.1	484.1	116.6
1980	15,236.8	197.3	1.3	1011.5	545.6	116.5
1979	14,150.8	338.3	2.4	989.6	487.4	117.2
Imperial Chemical Industries (U.K.)						
1982	$12,886.2	$253.9	2.0%	$ 511.4	$427.3	123.8
1981	13,348.9	389.5	2.9	833.7	464.5	132.4
1980	13,290.7	302.3[a]	2.3	1683.7	493.0	143.2
1979	11,397.0	970.2	8.5	1613.6	392.8	148.2
Montedison (Italy)						
1982	$6,665.9	($529.9)[b]	—	$324.5	$170.7	84.2
1981	7,851.3	(564.6)[b]	—	377.3	175.0	94.2
1980	9,090.0	(523.4)[b]	—	450.9	205.6	105.5
1979	8,222.6	14.4	0.2%	454.9	190.1	114.7
DSM (Netherlands)						
1982	$6,806.0	($70.3)[b]	—	$165.5	$63.7	28.6
1981	7,330.4	40.4	0.6%	196.8	64.0	30.0
1980	7,496.5	12.6	0.2	258.3	75.4	31.4
1979	6,343.3	44.3	0.7	266.7	67.2	31.8
Ciba-Geigy (Switzerland)						
1982	$6,802.0	$306.4	4.5%	$427.6	$578.8	79.4
1981	6,938.3	265.8	3.8	446.4	549.0	80.2
1980	7,134.1	182.6	2.6	510.8	561.1	81.1
1979	5,958.4	197.0	3.3	360.2	496.4	80.2
Rhône-Poulenc (France)						
1982	$5,661.5	($48.4)[b]	—	$359.2	$274.0	81.8
1981	5,932.4	(105.3)[b]	—	447.8	279.8	89.3
1980	7,139.2	($77.3)[b,c]	—	572.1	323.2	95.4
1979	7,948.5	186.1	2.3%	517.7	292.0	106.7
Akzo (Netherlands)						
1982	$5,301.1	$ 79.0	1.5%	$273.4	$232.2	73.7
1981	5,790.4	89.6	1.5	277.2	234.0	77.8
1980	6,257.8	85.4	1.4	324.1	258.8	83.1
1979	5,977.6	143.8	2.4	299.5	228.9	83.0
Solvay (Belgium)						
1982	$3,891.3	$ 56.8	1.5%	$153.8	$131.1	45.4
1981	4,239.7	(20.5)[b]	—	247.6	143.4	48.2
1980	4,734.9	67.6	1.4	368.0	154.0	49.1
1979	4,126.2	175.2	4.3	288.7	98.1	46.2
Hoffmann-La Roche (Switzerland)						
1982	$3,499.2	$138.5	4.0%	$346.7	$453.5	46.5
1981	3,456.4	129.1	3.7	308.6	414.2	44.0
1980	3,506.5	138.9	4.0	309.0	415.0	43.6
1979	3,127.0	131.9	4.2	318.1	389.2	42.7
Norsk Hydro (Norway)						
1982	$3,185.9	$123.1	3.9%	$509.3	na	19.6
1981	3,045.6	171.4	5.6	370.7	na	15.1
1980	2,854.0	207.1	7.3	326.3	na	13.5
1979	1,799.2	52.0	2.9	220.2	na	11.7
Sandoz (Switzerland)						
1982	$2,981.8	$134.5	4.5%	$124.6	$244.8	37.3
1981	2,941.8	115.8	3.9	155.6	236.2	36.4
1980	2,934.1	121.0	4.1	153.9	248.5	35.5
1979	2,677.1	104.2	3.9	124.7	232.5	35.3
BOC International (U.K.)						
1982	$2,686.9	$131.3	4.9%	$388.3	na	38.4
1981	3,066.6	116.6	3.8	316.0	na	42.1
1980	2,777.9	109.5	3.9	319.3	na	44.7
1979	2,609.3	94.7	3.6	280.7	na	48.6
Albright & Wilson (U.K.)						
1982	$ 929.6	$13.7	1.5%	$33.6	na	7.2
1981	1,019.9	11.0	1.1	51.7	na	8.9
1980	986.0	(4.0)[b]	—	70.5	na	9.2
1979	838.4	36.1	4.3	69.2	na	10.2
Fisons (U.K.)						
1982	$ 613.8	$25.4	4.1%	$ 3.2	$29.4[d]	7.5
1981	1,002.8	7.8	0.8	3.9	31.2[d]	9.6
1980	1,055.1	(3.3)[b]	—	4.9	32.6	11.3
1979	919.3	28.1	3.1	10.4	30.6	13.2
UCB (Belgium)						
1982	$606.6	$ 9.4	1.6%	$20.0	$17.2	6.7
1981	686.0	4.3	0.6	31.0	18.7	7.8
1980	786.4	8.1	1.0	38.2	21.9	8.1
1979	695.4	16.5	2.4	21.0	19.6	8.3
Laporte Industries (U.K.)						
1982	$425.5	$20.1	4.7%	$21.7	na	3.5
1981	435.5	12.8	2.9	20.3	na	3.9
1980	457.0	7.4	1.6	37.2	na	4.7
1979	403.6	17.4	4.3	34.0	na	4.8

a Excludes extraordinary write-off for company restructuring of $348.8 million. b Deficit. c Excludes extraordinary write-off for company restructuring of $383 million. d C&EN estimate. na = not available.

NOTE ON CURRENCY CONVERSION

For monetary statistics in this section, European currencies were converted to U.S. dollars by the following conversion rates:

	$1.00 (U.S.) is equivalent to:								
	Belgium	France	Italy	Netherlands	Norway	Spain	Sweden	Switzerland	U.K.	West Germany
1982	45.69 francs	6.57 francs	1353 lire	2.67 guilders	6.45 crowns	109.66 pesetas	6.28 crowns	2.03 francs	0.571 pound	2.43 marks
1981	37.13 francs	5.44 francs	1137 lire	2.50 guilders	5.74 crowns	92.31 pesetas	5.06 crowns	1.96 francs	0.493 pound	2.26 marks
1980	29.24 francs	4.23 francs	856 lire	1.99 guilders	4.94 crowns	71.71 pesetas	4.23 crowns	1.67 francs	0.430 pound	1.82 marks
1979	29.32 francs	4.25 francs	831 lire	2.01 guilders	5.06 crowns	67.12 pesetas	4.29 crowns	1.66 francs	0.471 pound	1.83 marks
1978	31.67 francs	4.50 francs	847 lire	2.16 guilders	5.22 crowns	76.00 pesetas	4.52 crowns	1.79 francs	0.521 pound	1.99 marks

Japan's basic petrochemicals industry, officially designated as "structurally depressed," is undergoing what the Japanese euphemistically call "structural reform." With the government's blessing—indeed, its urging—Japan's major petrochemical companies are joining together to agree upon scrapping excess production capacity and to form joint sales organizations.

Ethylene's performance tells the story. Production last year was 3.6 million metric tons, down 25% from its high of 4.8 million metric tons in 1979. With capacity at just over 6 million metric tons, a capacity-cutting program is easy to understand.

The picture with many other major petrochemicals is not much prettier. Caught between rising raw material costs and inability to raise prices in a depressed market, Japanese chemical companies feel the pinch on their earnings as they resort to cutthroat competition to maintain market share.

WORLD TRADE: Chemical surplus ends

$ Millions	1982	1981	1980	1979
Total exports	$138,831	$152,030	$129,807	$103,032
Total imports	131,931	143,290	140,528	110,372
Chemical exports	6,365	6,841	6,767	6,100
Chemical imports	6,824	6,487	6,202	5,178

Source: Ministry of International Trade & Industry

INDUSTRY TRENDS: Stagnation continues

Index, 1975 = 100	1982	1981	1980	Change 1981–82
All chemicals				
Production	148.9	144.9	144.7	3%
Shipments	139.7	137.7	139.9	1
Inventories	112.3	112.7	113.5	0
Petrochemicals				
Production	123.7	126.4	133.6	−2
Shipments	123.7	126.3	132.1	−2
Inventories	125.1	124.5	132.6	0
Plastics				
Production	143.3	142.4	149.3	1
Shipments	142.5	142.6	149.1	0
Inventories	105.9	111.2	116.2	−5
Synthetic fibers				
Production	123.6	126.0	128.7	−2
Shipments	127.9	131.7	131.7	−3
Inventories	93.7	81.3	77.1	15
Synthetic rubber				
Production	118.0	128.1	138.7	−8
Shipments	111.2	120.7	129.7	−8
Inventories	114.4	118.5	125.1	−3
Fertilizer				
Production	68.1	72.6	85.5	−6
Shipments	76.8	79.1	93.6	−3
Inventories	61.0	75.0	72.0	−19
All manufacturing				
Production	148.8	147.2	142.8	1
Shipments	139.9	139.9	137.1	0
Inventories	116.3	114.4	110.4	2

Source: Ministry of International Trade & Industry

PRODUCTION: Most chemicals down in 1982

Thousands of metric tons unless otherwise indicated	1982	1981	1980	1979	Change 1981–82
ORGANIC CHEMICALS					
Acetaldehyde	279	324	432	583	−14%
Acetic acid	353	365	418	502	−3
Acetone	229	225	235	254	2
Acrylonitrile	489	477	469	579	3
Benzene	1814	1899	2060	2178	−4
Butadiene	522	518	574	670	1
Butyl alcohol	234	237	222	252	−1
Caprolactam	388	427	443	437	−9
Cyclohexane	426	475	500	509	−10
Dioctylphthalate	221	223	241	259	−1
Ethylene	3588	3644	4176	4781	−2
Ethylene dichloride	1548	1650	2060	2110	−6
Ethylene glycol	385	411	492	572	−6
Ethylene oxide	471	478	529	593	−1
Methanol, refined	625	734	836	940	−15
Octyl alcohol, synthetic	226	239	241	264	−5
Phenol, synthetic	211	214	215	244	−1
Phthalic anhydride	254	254	235	284	0
Propylene	2545	2538	2636	3096	0
Propylene glycol	185	171	163	168	8
Styrene	1086	1095	1114	1238	−1
Terephthalic acid	649	635	601	613	2
Toluene	803	821	889	938	−2
Toluene diisocyanate	67	64	67	66	5
Xylene	1225	1202	1195	1317	2
Urea	1187	1483	1770	2083	−20
INORGANIC CHEMICALS					
Ammonium chloride	486	584	683	753	−17
Ammonium sulfate	1689	1817	1879	1883	−7
Calcium carbide	483	495	550	570	−2
Calcium superphosphate	527	483	591	568	9
Carbon black	504	557	575	538	−10
Chlorine, liquid	794	764	763	729	4
Hydrochloric acid	551	565	570	528	−2
Nitrogen, millions of cu m	5236	5147	4586	4150	2
Oxygen, millions of cu m	6493	6603	6854	7070	−2
Sodium carbonate	1162	1178	1357	1355	−1
Sodium hydroxide	2792	2872	3159	3021	−3
Sodium silicate	650	692	712	714	−6
Sulfuric acid	6530	6572	6777	6581	−1
Titanium dioxide	184	176	173	185	5
PLASTICS					
Phenolic resins	281	294	304	300	−4
Polyethylene	1674	1671	1860	2165	0
Polypropylene	941	959	927	1023	−2
Polystyrene	1190	1183	1129	1227	1
Polyvinyl chloride	1218	1129	1429	1592	8
DYES, synthetic	54	50	51	60	8
RUBBER CHEMICALS, organic	39	43	46	45	−9
RUBBER, synthetic	931	1010	1094	1107	−8

Source: Ministry of International Trade & Industry

COMPANY RESULTS: Profits improve for some firms, but margins remain slim

$ Millions	Sales	Net income	Profit margin	Total assets	Employees (thousands)
Mitsubishi Chemical Industries[a]					
1982	$3180	($25.4)[b]	—	$3325	8.4
1981	3399	13.5	0.4%	3374	8.3
1980	3730	39.6	1.1	3739	8.0
1979	2742	25.5	0.9	2996	8.2
Asahi Chemical Industry					
1982	$2741	$42.2	1.6%	$2809	14.0
1981	2663	48.4	1.8	2895	13.6
1980	2800	64.4	2.3	2825	13.6
1979	2168	47.2	2.2	2266	13.8
Sumitomo Chemical[c]					
1982	$2671	$21.2	0.8%	$2510	9.1
1981	2881	10.5	0.4	2699	9.6
1980	3167	45.0	1.4	2856	9.7
1979	2202	45.0	2.0	2017	9.9
Toray Industries					
1982	$2417	$46.6	1.9%	$2385	13.9
1981	2503	48.3	1.9	2446	13.9
1980	2494	57.9	2.3	2408	13.8
1979	1924	55.7	2.9	2010	13.9
Mitsui Toatsu Chemicals					
1982	$1781	$ 0.0	0.0%	$1790	5.7
1981	1948	(22.3)[b]	—	1858	7.4
1980	1965	(32.8)[b]	—	1941	7.7
1979	1624	36.3	2.2	1613	7.8
Teijin					
1982	$1770	$28.4	1.6%	$1953	7.1
1981	2072	24.1	1.2	2090	7.2
1980	2111	26.3	1.3	2093	7.3
1979	1613	26.6	1.8	1815	7.2
Dainippon Ink & Chemicals					
1982	$1620	$17.8	1.1%	$1426	5.9
1981	1657	18.8	1.1	1511	5.9
1980	1654	22.1	1.3	1446	5.8
1979	1301	18.4	1.4	1124	5.5
Showa Denko[c]					
1982	$1569	$ 4.2	0.3%	$2004	5.3
1981	1729	2.6	0.2	2102	5.4
1980	2083	35.7	1.7	2276	5.5
1979	1496	27.3	1.8	1475	4.3
Mitsubishi Petrochemical[c]					
1982	$1505	($42.4)[b]	—	$1767	3.5
1981	1667	(6.3)[b]	—	1802	3.9
1980	1900	16.2	0.9%	1908	3.8
1979	1366	16.5	1.2	1384	3.9
Sekisui Chemical					
1982	$1314	$10.6	0.8%	$1238	6.2
1981	1338	7.9	0.6	1322	6.1
1980	1420	17.0	1.2	1359	6.1
1979	1195	17.3	1.5	1107	6.0
Mitsui Petrochemical Industries					
1982	$1187	($8.5)[b]	—	$1412	4.5
1981	1260	(8.6)[b]	—	1455	4.6
1980	1339	10.8	0.8%	1474	4.6
1979	1167	23.2	2.0	1127	4.8
Unitika					
1982	$1102	$0.2	0.0%	$1113	6.2
1981	965	0.4	0.0	1135	6.2
1980	1011	4.1	0.4	1229	6.3
1979	785	2.3	0.3	1024	6.5

$ Millions	Sales	Net income	Profit margin	Total assets	Employees (thousands)
Kyowa Hakko Kogyo[c]					
1982	$920	$21.6	2.4%	$802	5.0
1981	928	18.8	2.0	782	4.9
1980	945	14.9	1.6	749	5.0
1979	694	12.1	1.7	585	4.8
Mitsubishi Gas Chemical					
1982	$916	$ 9.8	1.1%	$884	3.8
1981	931	20.8	2.2	938	3.8
1980	898	30.7	3.4	948	3.8
1979	714	19.7	2.8	740	3.8
Toyo Soda Mfg.					
1982	$690	$ 0.0	0.0%	$1131	4.3
1981	927	(60.4)[b]	—	1209	4.9
1980	942	5.2	0.6	1251	5.0
1979	809	14.5	1.8	977	4.9
Mitsubishi Rayon					
1982	$835	$10.1	1.2%	$824	3.6
1981	894	11.0	1.2	803	3.5
1980	882	11.1	1.3	814	3.5
1979	676	23.6	3.5	703	3.4
Kuraray					
1982	$820	$5.1	0.6%	$904	6.3
1981	879	8.2	0.9	928	6.3
1980	956	7.5	0.8	984	5.7
1979	762	2.7	0.4	824	5.2
Denki Kagaku Kogyo					
1982	$801	$ 8.5	1.1%	$1091	4.0
1981	867	10.4	1.2	1092	4.0
1980	893	10.8	1.2	1078	4.0
1979	761	17.1	2.3	881	4.0
Hitachi Chemical					
1982	$746	$9.5	1.3%	$465	4.4
1981	753	9.9	1.3	451	4.3
1980	746	8.2	1.1	440	4.3
1979	596	8.6	1.4	336	4.1
Japan Synthetic Rubber					
1982	$695	$ 5.5	0.8%	$709	2.7
1981	737	3.0	0.4	720	2.7
1980	779	8.2	1.1	761	2.6
1979	542	12.6	2.3	579	2.6
Tokuyama Soda					
1982	$691	$4.2	0.6%	$869	2.5
1981	768	4.4	0.6	691	2.5
1980	767	5.2	0.7	682	2.4
1979	616	5.8	0.9	546	2.4
Kanegafuchi Chemical Industry					
1982	$683	$ 6.8	1.0%	$546	3.3
1981	719	5.9	0.8	583	3.2
1980	776	13.3	1.7	612	3.1
1979	661	16.0	2.4	466	3.0
Daicel Chemical					
1982	$664	$14.4	2.2%	$634	3.1
1981	702	12.5	1.8	656	3.1
1980	677	12.6	1.9	659	3.1
1979	501	15.7	3.1	467	3.1
Shin Etsu Chemical[d]					
1982	$657	$ 8.5	1.3%	$601	2.5
1981	674	8.5	1.3	629	2.4
1980	653	11.5	1.8	600	2.3
1979	551	14.3	2.6	418	2.2

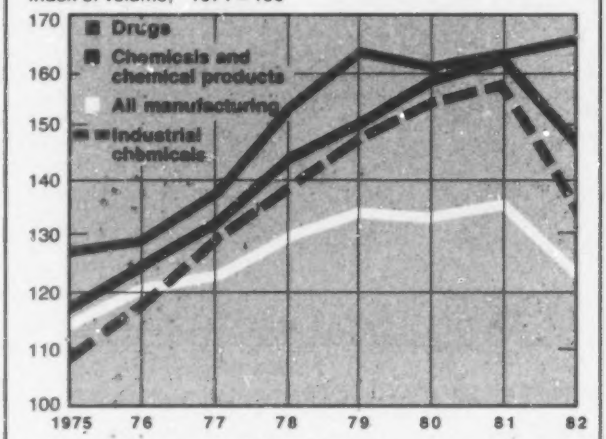
a Fiscal year ends Jan. 31. b Deficit. c Fiscal year ends Dec. 31. d Fiscal year ends May 31. **Note:** Fiscal years ending March 31 of each year unless otherwise specified. Fiscal year 1982 data are estimates. Results were converted from yen to U.S. dollars on the following basis: fiscal year 1982: $1.00 = 235.8 Y; fiscal year 1981: $1.00 = 222.4 Y; fiscal year 1980: $1.00 = 212.9 Y; fiscal year 1979: $1.00 = 249.4 Y. Year-to-year changes in sales, net income, and assets are affected by fluctuations in the currency exchange rate. **Source:** Toyo Keizai Shinposha

Three strikes and the Canadian chemical industry was out last year.

Strike one was the worst recession that Canada has seen since the Great Depression. Strike two was a downturn in world markets that the Canadian industry depends upon to soak up output from the world-scale plants that it has built in recent years. Strike three was the national energy policies that drove up prices of oil, natural gas, and petrochemical feedstocks when they were declining virtually everywhere else in the world.

The results were predictable. Sales were down. Profits were down. And production cutbacks struck across the board. Fertilizer materials, basic and intermediate petrochemicals, plastics, and inorganics all felt the impact of the domestic and worldwide economic slowdown. Chemical exports dropped almost 12% to $4 billion (Canadian). Several chemical companies chalked up the worst financial results of their history, and at least two companies, Petrosar and Petromont, were on the verge of collapse without government aid.

Production of chemicals nosedives



a Gross domestic product. **Source:** Statistics Canada

COMPANY RESULTS: Red ink for most firms

$ Millions (Canadian)	Sales	Net income[a]	Profit margin	Capital expenditures	Employees (thousands)
C-I-L INC.[b]					
1982	$1059.8	$15.2	1.4%	$85.5	6.9
1981	1149.9	54.3	4.7	94.1	7.8
1980	1004.2	51.5	5.1	70.2	8.3
1979	880.0	36.3	4.1	84.4	8.0
CELANESE CANADA					
1982	$ 323.9	($5.6)[c]	—	$59.8	3.4
1981	373.0	20.4	5.4%	87.7	3.5
1980	336.2	24.2	7.2	55.1	4.2
1979	353.6	21.2	6.0	24.4	4.4
DU PONT CANADA					
1982	$ 980.0	($7.4)[c]	—	$24.0	5.4
1981	1139.1	33.5	2.9%	47.0	6.1
1980	995.3	42.6	4.3	53.2	5.9
1979	879.6	58.9	6.7	23.3	5.6
POLYSAR					
1982	$1330.0	($30.5)[c]	—	$207.0	6.6
1981	1049.0	74.0	7.1%	58.3	5.4
1980	1171.0	73.4	6.3	86.2	6.1
1979	1136.4	22.0	1.7	199.3	7.1
UNION CARBIDE CANADA					
1982	$ 691.3	($17.9)[c]	—	$ 67.6[d]	4.5
1981	827.3	36.1	4.4%	100.0	5.0
1980	794.8	79.6	10.0	58.9	5.0
1979	685.9	57.8	8.4	30.1	4.8

a Excluding extraordinary gains and losses. b Name changed from Canadian Industries Ltd. on Jan. 1, 1980. c Deficit. d Excludes $50.9 million spent on Prentiss, Alta., ethylene glycol plant that was transferred to another Union Carbide subsidiary.

TRADE BALANCE: Big gain for total surplus

$ Millions (Canadian)	1982	1981	1980	1979
Exports[a]	$81,434	$81,203	$74,446	$64,317
Imports	67,355	79,129	69,274	62,871
Trade balance	14,109	2,074	5,172	1,446

Lower exports hurt chemical surplus

$ Millions (Canadian)	1982	1981	1980	1979
Exports[a]	$4073	$4605	$4056	$3322
Imports	3584	3814	3354	3240
Trade balance	489	791	702	82

a Domestic exports only. **Source:** Statistics Canada

PRODUCTION: Cutbacks almost everywhere

Thousand of metric tons	1982	1981	1980	1979	Change 1981–82
Ammonia, anhydrous	2509	2654	2555	2405	−5%
Ammonium nitrate	1018	1212	873	914	−16
Ammonium phosphate	888	1355	1466	1336	−34
Benzene	504	571	604	492	
Chlorine	1233	1292	1303	1031	−5
Ethylene	1013	1330	1184	1014	−24
Hydrochloric acid	135	186	177	154	−27
Phosphoric acid, 100% P_2O_5	503	744	808	748	−32
Polyesters, unsaturated	19	26	27	32	−27
Polyethyene	571	633	641	628	−10
Polystyrene	133	123	110	124	8
Polyvinyl chloride	194	222	190	145	−13
Sodium chlorate	264	251	245	224	4
Sodium hydroxide	1367	1458	1459	1138	−6
Sulfuric acid, 100%	3131	4117	4295	3666	−24
Urea	1231	1303	1274	1212	−6

Source: Statistics Canada

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6 Foreign Chemical Industries Canada

SHIPMENTS: Lower dollar volume reflects last year's business recession

$ Millions (Canadian)	Shipments, monthly average											Average annual change	
	1982	1981	1980	1979	1978	1977	1976	1975	1974	1973	1972	1981–82	1972–82
All manufacturing	$15,249.8	$15,776.0	$13,913.2	$12,520.7	$10,743.7	$9070.6	$8190.4	$7371.6	$6871.2	$5563.1	$4687.2	−3%	13%
Chemicals and chemical products	1,036.8	1,059.4	929.7	791.9	663.3	535.6	475.3	425.6	383.9	291.9	246.2	−2	15
Petroleum and coal products	1,723.0	1,633.3	1,206.7	1,003.0	837.9	711.0	576.8	496.1	432.1	256.1	203.4	5	24
Rubber and plastics products	359.1	379.8	334.7	300.3	250.1	211.0	192.7	162.9	152.8	131.4	109.7	−5	13
Paper and allied products	1,212.3	1,294.5	1,185.5	1,032.0	839.5	744.8	685.7	594.2	639.7	439.2	367.8	−6	13

Source: Statistics Canada

PRICES: Inflation continues, but generally at a more moderate rate in 1982

Industry selling price indexes, 1971 = 100	Annual average										Annual change	
	1982	1981	1980	1979	1978	1977	1976	1975	1974	1973	1981–82	1972–82
All manufacturing industries	288.7	272.2	247.2	217.8	190.4	174.3	161.6	153.7	138.1	116.1	6%	11%
Chemicals and chemical products	306.8	286.2	251.6	214.8	189.3	175.9	167.2	160.3	137.1	106.5	7	12
Industrial chemicals—inorganic	337.9	313.9	275.3	234.1	204.1	188.4	179.7	169.5	133.5	107.7	8	12
Acetylene, compressed	324.9	266.3	232.9	213.2	191.2	170.7	163.7	150.6	116.2	102.9	22	14
Caustic soda	450.1	383.8	281.0	240.1	221.4	210.7	195.7	169.5	120.2	107.0	17	16
Chlorine	315.6	274.8	248.4	207.9	189.2	180.5	163.3	144.4	114.1	104.3	15	12
Oxygen, gas, and liquid	224.0	215.6	202.4	191.8	174.6	156.8	152.1	136.0	121.2	108.3	4	7
Industrial chemicals—organic	429.7	410.2	354.7	289.0	240.8	228.1	214.2	201.2	170.0	107.8	5	14
Plastics and synthetic resins	297.7	294.7	274.4	239.7	206.4	193.3	187.4	181.6	156.0	104.2	1	9
Alkyd	208.5	196.5	176.9	158.4	137.5	129.4	131.4	135.1	134.8	109.4	6	10
Phenol formaldehyde	344.6	337.6	332.8	300.9	233.6	232.1	235.6	240.9	214.1	111.4	2	8
Polyethylene	290.3	326.9	315.3	268.9	223.2	220.3	221.6	213.2	166.3	103.2	−11	6
Fertilizers, mixed	295.1	290.5	280.3	229.1	191.0	180.2	176.9	204.0	167.5	117.2	2	10
Drugs	211.7	189.7	169.5	153.1	140.4	131.4	127.0	121.1	109.9	103.5	12	10
Paint and varnish	298.3	280.3	239.8	202.3	183.0	172.8	161.9	153.9	131.9	108.2	5	12
Pigments and dry colors	332.9	304.4	260.0	219.6	189.7	175.3	164.9	153.4	136.0	103.7	9	14
Soaps and cleansing compounds	225.5	209.7	189.1	169.5	151.2	141.1	134.5	132.1	118.0	105.3	7	10

Source: Statistics Canada

CHEMICAL IMPORTS: Recession cuts demand

$ Millions (Canadian)[a]	1982	1981	1980	Change 1981–82
Inorganic chemicals	$ 370	$ 399	$ 343	−7%
Organic chemicals	1019	1090	930	−7
Fertilizers and fertilizer materials	143	157	135	−9
Synthetic and reclaimed rubber	142	160	126	−11
Plastics materials	549	607	537	−10
Plastic film and sheet	208	243	192	−14
Other plastic shapes and forms	137	154	129	−11
Dyes, except dyeing intermediates	63	76	80	−17
Pigments, lakes, and toners	52	65	54	−20
Paints and related products	85	98	86	−13
Other chemical products	817	765	742	7
TOTAL	**$3584**	**$3814**	**$3354**	**−6%**

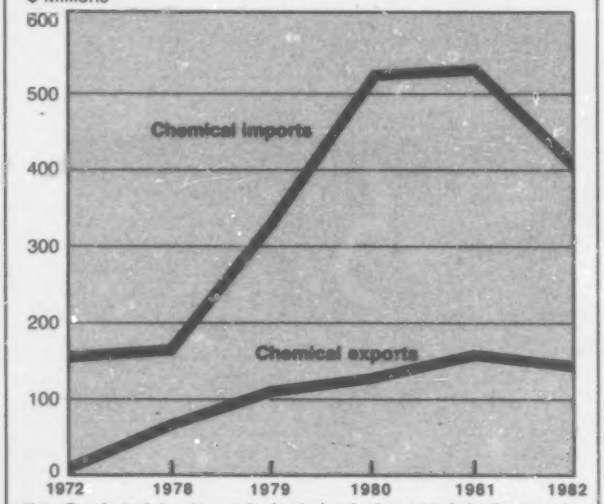
Source: Statistics Canada

CHEMICAL EXPORTS: Big groups slump

$ Millions (Canadian)[a]	1982	1981	1980	Change 1981–82
Chemical elements	$ 170	$ 147	$ 161	16%
Other inorganic chemicals	827	1064	947	−22
Organic chemicals	1099	1183	924	−7
Fertilizers and fertilizer materials	1059	1343	1254	−21
Synthetic rubber and plastic materials	516	513	468	1
Plastics, basic shapes and forms	173	149	124	16
Other chemical products	229	206	178	11
TOTAL	**$4073**	**$4605**	**$4056**	**−12%**

a Domestic exports only. **Source:** Statistics Canada

Chemical foreign trade shrunk in 1982



Note: Data for trade in primary petrochemicals only; does not include other secondary chemicals. Source: Petróleos Mexicanos

DOMESTIC SALES: Some declines in 1982

Thousands of metric tons[a]	1982	1981	1980	1979	Change 1981–82
Acetaldehyde	156.2	123.7	100.9	58.1	26%
Acrylonitrile	71.4	74.2	67.9	60.1	−4
Ammonia	1338.1	1204.8	966.8	885.7	11
Benzene	12.8	12.2	12 6	11.0	5
Butadiene	66.0	69.5	66.1	57.4	−5
Cyclohexane	50.5	52.6	52.8	52.0	−4
Dodecylbenzene	111.3	92.5	90.1	83.8	20
Ethylene oxide	77.6	77.9	70.5	56.6	0
Hexane	54.2	51.0	46.1	38.9	6
Isopropyl alcohol	47.5	32.4	27.8	21.4	47
Methanol	129.0	125.2	97.8	84.4	3
Perchloroethane	12.7	15.3	13.5	14.6	−17
Polyethylene, high density	120.3	100.1	79.5	63.1	20
Polyethylene, low density	261.3	257.5	224.3	170.4	1
Styrene	117.6	116.9	101.2	99.2	1
Sulfur	365.2	427.5	408.0	243.2	−15
Toluene	86.5	88.4	81.3	76.9	−2
Vinyl chloride	138.7	144.7	148.1	119.8	−4
o-Xylene	26.9	27.0	30.7	28.4	0
p-Xylene	186.9	186.8	116.4	96.7	0

a Domestic sales by Petróleos Mexicanos (Pemex) of primary petrochemicals. Source: Pemex

PRODUCTION: Gains despite economic slump

Thousands of metric tons[a]	1982	1981	1980	1979	Change 1981–82
Acetaldehyde	149.1	122.2	47.6	48.8	22%
Acrylonitrile	52.7	54.0	54.3	23.3	−2
Ammonia, anhydrous	2469.3	2183.2	1863.2	1652.7	13
Benzene	96.0	76.5	79.3	70.5	25
Butadiene	14.6	12.3	17.0	17.3	19
Cyclohexane	34.9	44.1	39.7	29.2	−21
Cumene	20.4	1.6	0	0	1175
Dichloroethane	201.1	116.9	106.3	97.3	72
Dodecylbenzene	61.6	59.5	55.4	62.8	4
Ethane	1550.3	1337.4	632.2	607.5	16
Ethylbenzene	23.0	29.1	29.3	32.6	−21
Ethylene	395.8	378.3	365.5	342.7	5
Ethylene oxide	79.0	48.5	29.7	24.3	63
Hexane	75.6	65.6	60.1	53.4	16
Hydrochloric acid	46.7	33.2	36.1	31.9	41
Isopropyl alcohol	10.9	15.6	12.6	0.6	−30
Methanol	191.3	179.7	173.6	147.0	6
Nitrogen	39.0	29.5	0	0	32
Oxygen	208.4	159.1	0	0	40
Polyethylene, high density	78.2	78.1	66.9	58.4	0
Polyethylene, low density	93.3	91.2	91.4	95.6	2
Propylene	157.6	156.2	136.9	159.9	1
Propylene tetramer	38.5	35.4	35.8	43.0	9
Styrene	29.0	32.9	31.3	31.2	12
Sulfur, recovered	424.9	425.5	402.4	249.4	0
Toluene	138.1	131.3	124.9	107.9	5
Vinyl chloride	79.4	56.9	62.5	55.7	40
m- and *p*-Xylene	99.2	86.6	77.2	66.0	15
o-Xylene	15.8	16.7	16.1	15.8	−5

a Production of primary petrochemicals by Petróleos Mexicanos (Pemex). Source: Pemex

CHEMICAL IMPORTS: Many being displaced

Thousands of metric tons[a]	1982	1981	1980	1979	Change 1981–82
Acetaldehyde	12.9	5.9	58.2	10.2	119%
Acrylonitrile	16.8	19.7	8.6	43.0	−15
Benzene	12.2	21.0	14.5	19.9	−42
Butadiene	49.6	55.0	54.8	34.4	−10
Cyclohexane	13.0	7.9	10.1	20.3	65
Dichloroethane	0.0	1.7	14.3	9.0	—
Dodecylbenzene	47.4	32.8	41.3	31.5	45
Ethylbenzene	15.9	10.8	10.0	13.4	47
Ethylene	31.4	15.1	0.0	0.0	108
Ethylene oxide	0.0	31.1	34.4	25.3	—
Isopropyl alcohol	31.1	15.1	18.0	21.7	106
Perchloroethylene	11.3	16.7	5.5	15.1	−32
Polyethylene, high density	17.2	10.2	26.0	5.8	69
Polyethylene, low density	105.7	125.9	104.0	35.9	−16
Propylene	22.1	24.3	20.3	0.2	−9
Propylene tetramer	15.2	23.1	14.5	15.6	−34
Styrene	60.9	87.8	78.7	72.7	−31
Toluene	11.8	22.8	36.7	40.7	−48
Vinyl chloride	70.7	84.3	88.8	62.8	−16
o-Xylene	9.8	12.1	13.3	9.6	−19
p-Xylene	130.6	148.0	94.5	82.3	−12

a Imports by Petróleos Mexicanos (Pemex) of primary petrochemicals. Source: Pemex

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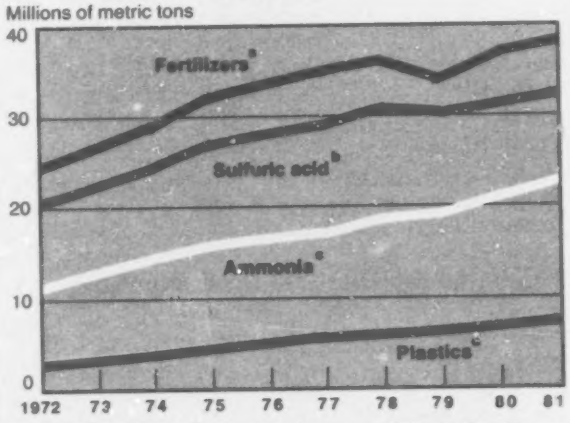
6 Foreign Chemical Industries Eastern Europe

In 1982, industrial output in East Europe and the Soviet Union continued to grow at the slow pace of recent years—up just 2.2% for the region (compared to a goal of 4.2%, and an average rate of 4.8% from 1976 to 1980). Production fell below 1981 growth rates in all seven countries and failed in most nations to meet the modest targets set by national five-year plans. In troubled Poland, production dropped 4%, following a 10.5% decline in 1981. The chemical industries in all the countries showed slower growth in both 1981 and 1982. Output of chemicals and rubber in Czechoslovakia last year actually dropped slightly.

Output of some major chemical products is moving higher



a As N, P_2O_5, and K_2O. b 100% H_2SO_4. c Nitrogen content. d Including resins for man-made fibers in U.S.S.R. **Note:** Data for U.S.S.R., Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, and Romania. **Sources:** Central Intelligence Agency, Department of Agriculture, C&EN estimates

PRODUCTION GROWTH: Pace continues slow

% annual change in gross output	1982	1981	1980	1979	1978
U.S.S.R. and East Europe					
All industry	2.2%	2.2%	3.4%	3.7%	5.1%
Bulgaria					
All industry	4.6	4.8	4.2	5.5	6.9
Chemicals and rubber	1.3	4.2	11.1	9.1	10.0
Czechoslovakia					
All industry	1.0	2.1	3.5	3.7	5.0
Chemicals and rubber	−0.3	1.7	4.8	3.3	na
East Germany					
All industry[a]	3.2	4.7	4.7	4.6	3.7
Chemicals and rubber	na	3.7	3.3	4.0	6.0
Hungary					
All industry	2.0	2.8	−2.0	3.0	4.9
Chemicals and rubber	1.8	3.1	−2.1	6.1	10..
Poland					
All industry	−4.0[b]	−10.5	0.0	2.7	4.9
Chemicals and rubber	na	−1.14	0.4	2.3	3.9
Romania					
All industry	1.1	2.6	6.5	8.1	9.6
Chemicals and rubber	na	3.9	6.8	1.4	10.6
U.S.S.R.					
All industry[c]	2.8	3.4	3.6	3.4	4.8
Chemicals and rubber[c]	3.0	5.5	5.6	2.3	6.0
All industry[d]	na	2.0[e]	2.9	3.0	3.5
Chemicals and rubber[d]	na	3.5[e]	5.2	0.2	3.6

a Industrial commodity production. b Estimated. c Figures based on official Soviet statistics. d Figures based on Central Intelligence Agency estimates, giving lower results because of postulated upward bias in official figures. e Preliminary figure. na = not available. **Sources:** United Nations Economic Commission for Europe, based on official national statistics, Central Intelligence Agency

MAN-MADE FIBERS: Little change in U.S.S.R.

Production, millions of lb	1982[a]	1981	1980	1979	Change 1981–82
NONCELLULOSIC FIBERS[b]					
Bulgaria	125	114	110	106	10%
Czechoslovakia	251	178	168	159	41
East Germany	315	313	306	292	1
Hungary	44	47	43	40	−6
Poland	283	260	359	338	9
Romania	309	304	300	309	2
U.S.S.R.	1268	1242	1213	1049	2
TOTAL	2595	2458	2499	2293	6%
CELLULOSIC FIBERS					
Bulgaria	84	81	80	73	4%
Czechoslovakia	121	120	121	148	1
East Germany	358	364	372	364	−2
Hungary	17	16	20	19	6
Poland	142	141	190	185	1
Romania	142	142	140	143	0
U.S.S.R.	1400	1419	1433	1400	−1
TOTAL	2264	2283	2356	2332	−1%

a Preliminary figures. b Excluding olefins and textile glass. **Source:** Textile Economics Bureau

AGRICULTURAL CHEMICALS: Fertilizer supply stagnates in Eastern Europe

Thousands of metric tons	1982[a]	1981	1980	1979	1978
Bulgaria					
Fertilizer supply[b]	1,040	1,040	830	820	738
Pesticide supply	na	48.7	40.0	34.8	35.3
Czechoslovakia					
Fertilizer supply[b]	1,722	1,722	1,730	1,745	1,748
East Germany					
Fertilizer supply[b]	1,725	1,725	1,637	1,713	1,670
Pesticide supply	na	27.0	27.0	26.7	25.3
Hungary					
Fertilizer supply[b]	1,542	1,478	1,399	1,502	1,539
Poland					
Fertilizer supply[b]	3,373	3,492	3,635	3,567	3,606
Pesticide supply	na	38.4	29.3	44.4	49.8
Romania					
Fertilizer supply[b]	1,114	1,082	1,185	1,431	1,480
U.S.S.R.					
Fertilizer supply[b]	20,100	19,176	18,763	17,365	18,420
Pesticide supply	na	509	482	na	na

a Preliminary figures. b Nutrient content. na = not available. **Sources:** United Nations Economic Commission for Europe, based on official national statistics; Department of Agriculture

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PRODUCTION: U.S.S.R. accounts for more than two thirds of fertilizers and half of plastics

Thousands of metric tons, unless otherwise noted	1982[a]	1981	1980	1979	1978
U.S.S.R.					
Sulfuric acid, 100%	23,800	24,100	23,033	22,364	22,411
Mineral fertilizers (gross weight)	na	109,106	103,858	94,523	97,976
Mineral fertilizers[b]	26,390	25,998	24,760	22,137	23,653
Nitrogen[b]	11,000	10,705	10,241	9,151	9,299
Phosphate[b,c]	7,010	6,836	6,455	6,344	6,153
Potassium[b]	8,680	8,449	8,064	6,635	8,193
Synthetic ammonia[d]	na	14,650	13,762	12,278	11,462
Sodium carbonate 100%	na	4,900	4,800	4,782	4,858
Plastics[e]	4,100	4,090	3,636	3,478	3,516
Sodium hydroxide, 100%	na	2,757	2,755	2,680	2,763
Synthetic rubber[f]	na	1,860	1,880	1,867	1,795
Rubber tires[g] (thousands of units)	61,700	60,500	60,100	59,981	59,018
Pesticides	533	504	470	475	491
Bulgaria					
Sulfuric acid, 100%	na	920	852	998	974
Mineral fertilizers[b]	999	1,010	947	959	968
Nitrogen[b]	760	753	730	677	685
Phosphate[b]	239	258	217	282	283
Synthetic ammonia[d]	na	1,023	1,009	951	960
Plastics	na	284	254	200	178
Sodium hydroxide, 100%	na	157	161	107	102
Synthetic rubber	na	30	30	30	25
Rubber tires[g] (thousands of units)	na	2,230	2,117	1,793	1,734
CZECHOSLOVAKIA					
Sulfuric acid, 100%	na	1,318	1,284	1,253	1,195
Mineral fertilizers[b]	na	1,085	1,182	1,140	1,176
Nitrogen[b]	na	539	618	591	625
Phosphate[b,c]	na	340	361	358	367
Potassium[b,h]	na	206	203	199	191
Synthetic ammonia[d]	na	na	841	804	812
Plastics	956	913	894	853	810
Sodium hydroxide, 100%	na	331	326	312	311
Synthetic rubber	na	60	60	59	59
Rubber tires[g] (thousands of units)	na	na	6,714	6,581	6,439
EAST GERMANY					
Sulfuric acid, 100%	na	na	958	952	971
Mineral fertilizers[b]	na	4,787	4,735	4,740	4,628
Nitrogen[b]	na	967	943	875	892
Phosphate[b,c]	na	360	370	411	413
Potassium[b]	na	3,460	3,422	3,395	3,323
Synthetic ammonia[d]	na	na	1,159	1,079	1,137
Plastics	na	998	861	779	762
Sodium hydroxide, 100%	na	631	626	548	415
Synthetic rubber	na	175	170	165	145
Rubber tires[g] (thousands of units)	na	7,026	7,067	6,890	6,728
HUNGARY					
Sulfuric acid, 100%	na	600	614	613	690
Mineral fertilizers[b]	na	893	853	850	855
Nitrogen[b]	na	589	559	550	534
Phosphate[b]	na	158	149	165	185
Potassium[b,h]	na	146	145	143	136
Synthetic ammonia[d]	na	na	900	803	746
Plastics	na	311	328	294	213
Sodium hydroxide, 100%[i]	na	180	188	194	146
Rubber tires[g] (thousands of units)	na	870	870	750	773
POLAND					
Sulfuric acid, 100%	na	2,776	3,019	2,983	3,172
Mineral fertilizers[b]	2,283	2,242	2,238	2,431	2,621
Nitrogen[b]	1,297	1,274	1,290	1,376	1,470
Phosphate[b]	868	866	843	931	1,026
Potassium[b,h]	118	103	105	110	125
Synthetic ammonia[d]	na	1,465	1,483	1,530	1,616
Plastics	na	475	549	440	467
Sodium hydroxide, 100%	na	400	415	436	469
Synthetic rubber	na	111	118	130	126
Rubber tires[g] (thousands of units)	na	na	8,743	8,500	7,852
ROMANIA					
Sulfuric acid, 100%	na	na	1,756	1,750	1,655
Mineral fertilizers[b]	2,700	2,640	2,451	2,522	2,461
Nitrogen[b]	na	1,822	1,689	1,738	1,723
Phosphate[b]	na	717	689	709	660
Potassium[b,h]	na	102	73	75	78
Synthetic ammonia[d]	na	na	2,267	2,333	2,259
Plastics	na	580	579	516	552
Sodium hydroxide, 100%	na	na	705	704	725
Synthetic rubber	na	146	150	149	147
Rubber tires[g] (thousands of units)	na	5,250	5,046	4,691	4,690

a Approximate figures. b Nutrient content basis, as N, P_2O_5, or K_2O. c Including production of ground phosphate rock for direct applications and phosphate animal feeds. d Nitrogen content. e Including resins for man-made fibers. f Estimated. g For all motor vehicle tires, excluding aircraft and bicycle tires. h Imported potash added to domestically produced nitrogen and phosphate to form multinutrient fertilizer. i Including regenerated NaOH. na = not available. **Sources:** Central Intelligence Agency, Department of Commerce, Department of Agriculture, United Nations Economic Commission for Europe (based on official national statistics)

SOVIET FOREIGN TRADE: Deficit in chemical trade balance has been widening steadily

$ Millions	1982	1981	1980	1979	1978	1977	1976	1975	1974	1973	1972
Exports[a]	$87,168	$79,380	$76,437	$64,912	$52,435	$45,227	$37,269	$33,407	$27,374	$21,332	$15,409
Imports[a]	77,847	73,157	68,473	57,958	50,798	40,926	38,212	37,070	24,861	20,980	16,104
Trade balance	9,321	6,223	7,964	6,954	1,637	4,301	−943	−3,663	2,513	352	−695
Chemical exports[a]	na	2,398	2,157	1,606	1,284	1,063	939	1,027	887	549	439
Chemical imports[a]	na	4,222	3,861	2,803	2,188	1,850	1,668	1,747	1,448	954	868
Chemical trade balance	na	−1,824	−1,704	−1,197	−904	−787	−729	−720	−561	−405	−429

a Free on board. na = not available. **Sources:** Central Intelligence Agency, Department of Commerce, based on official Soviet statistics and exchange rates

6 Foreign Chemical Industries Western Pacific

KOREA

INDUSTRY TRENDS: Chemical output slips

Index, 1980 = 100	1982	1981	1980	1979	Change 1981–82
Chemicals, petroleum, coal, rubber, and plastic products					
Production	105.9	102.5	100.0	100.3	3%
Shipments	102.4	101.5	100.0	98.6	1
Inventories	117.9	114.8	100.0	72.0	3
Industrial chemicals					
Production	101.5	103.5	100.0	97.0	−2
Shipments	107.8	105.1	100.0	88.9	3
Inventories	120.5	126.6	100.0	75.6	−5
Other chemical products					
Production	122.4	106.1	100.0	108.4	15
Shipments	119.3	106.6	100.0	106.5	12
Inventories	118.5	94.7	100.0	90.9	25
Rubber products					
Production	97.7	98.9	100.0	89.3	−1
Shipments	93.5	94.9	100.0	88.3	−1
Inventories	96.9	107.9	100.0	53.5	−10
Plastic products					
Production	92.6	91.7	100.0	127.9	1
Shipments	92.2	91.2	100.0	124.8	1
Inventories	121.7	96.5	100.0	105.0	26
All manufacturing					
Production	119.2	113.5	100.0	101.9	5
Shipments	116.1	111.3	100.0	99.6	4
Inventories	126.5	110.4	100.0	72.7	15

Source: Korean Bureau of Statistics

FOREIGN TRADE: Deficit narrowed last year

$ Millions	1982	1981	1980	1979
Exports[a]	$21,853	$21,254	$17,505	$15,056
Imports[b]	24,251	26,131	22,292	20,339
Trade balance	−2,398	−4,877	−4,787	−5,283
Chemical exports	731	682	780	532
Chemical imports	2,080	2,109	1,836	2,009
Chemical trade balance	−1,349	−1,427	−1,055	−1,477

a Free on board. b Includes cost, insurance, freight. **Source:** Korean Bureau of Statistics

PRODUCTION: Nitrogen fertilizers decline

Thousands of metric tons	1982	1981	1980	1979	Change 1981–1982
Sulfuric acid	1596	1304	1702	1645	22%
Complex fertilizers	1667	1211	1439	1696	38
Ammonia	661	908	1031	1169	−27
Urea fertilizers	788	1070	973	1166	−26
Ethylene	374	374	368	na	0
Polyvinyl chloride	312[a]	287	232	192	9
Sodium carbonate	186[a]	202	222	204	−8
Insecticides	58	54	75	101	7
Synthetic detergents	52	57	64	70	−8

a Preliminary value. na = not available. **Source:** Korean Bureau of Statistics

AUSTRALIA

PRODUCTION: Little change in past few years

Thousands of metric tons	1982[a]	1981[a]	1980[a]	1979[a]	Change 1981–82
Chemicals and acids					
Hydrochloric acid, 100%	55	59	63	58	−7%
Nitric acid, 100%	180	182	180	169	−1
Sulfuric acid, 100%	2027	1963	2175	1922	3
Ammonium sulfate	207	211	203	212	−2
Superphosphate[b]	3568	3770	4202	3646	−5
Plastics and resins	799	806	796	614	−1
Synthetic detergents	205	199	202	185	3
Unsupported plastics film, sheeting	118	125	130	118	−6
Polyethylene[c]	82	84	89	77	?
Polyvinyl chloride[d]	20	18	17	16	11

a Years ending June 30. b Includes double and triple superphosphates and ammonium phosphate expressed in terms of single phosphate (22% P_2O_5 equivalent). c Low and high density. d Including copolymers. **Source:** Australian Bureau of Statistics

FOREIGN TRADE: Overall balance unfavorable

$ Millions	1982[a]	1981[a]	1980[a]	1979[a]
Exports[b,c]	$20,946	$22,314	$21,079	$16,219
Imports[d]	24,617	22,068	18,116	15,662
Trade balance	−3,671	246	2,963	557
Chemical exports[b,c]	430	487	424	351
Medicinal products	95	95	78	74
Chemical imports[d]	1,955	1,842	1,764	1,368
Organic chemicals	530	509	543	371
Chemical trade balance	−1,525	−1,355	−1,340	−1,017

a Years ending June 30. b Free on board. c Includes re-exports. d Values for customs purposes, free-on-board basis. **Source:** Australian Bureau of Statistics

CHINA

PRODUCTION: Growth last year generally was stronger than in 1981

Thousands of metric tons	1982	1981	1980	1979	Change 1981–82
Ammonia[a]	na	11,990	12,150	10,727	na
Fertilizer[b]	12,781	12,360	12,320	10,654	3%
Nitrogen (N)	10,219	9,860	9,990	8,821	4
Phosphate (P_2O_5)[c]	2,537	2,510	2,310	1,817	1
Potash (K_2O)	25	20	20	16	25
Sulfuric acid	8,170	7,810	7,640	7,000	5
Sodium hydroxide	2,073	1,923	1,923	1,826	8
Sodium carbonate	1,735	1,652	1,613	1,486	5

Thousands of metric tons	1982	1981	1980	1979	Change 1981–82
Calcium carbide	1,670	1,510	1,520	1,407	10%
Plastics	1,003	916	898	793	9
Insecticides	457	484	537	537	−6
Ethylene	560	500	490	435	12
Synthetic detergents	569	478	393	397	19
Man-made fibers	517	527	450	326	−2
Pharmaceuticals	42	37	40	42	13

a Nitrogen content of ammonia produced for fertilizer. b Nutrient content. c Including production of ground phosphate rock for direct application and phosphate animal feeds. na = not available. **Sources:** State Statistical Bureau of the People's Republic of China, Central Intelligence Agency

CHEMICAL IMPORTS: Down in 1981

$ Millions[a]	1981	1980	1979	Change 1980–81
Fertilizers[b]	$ 807	$ 978	$ 609	−17%
Nitrogenous fertilizer	500	674	511	−26
Chemical elements and compounds	477	542	405	−12
Organic chemicals	381	391	255	−3
Plastic materials, resins	471	372	156	27
Dyeing, tanning, and coloring materials	109	80	88	36
Medicinal products	28	19	13	47
Essential oils, perfume, and cleansing materials	16	9	10	78
Other chemicals[c]	157	182	165	−14
TOTAL	**$2066**	**$2182**	**$1446**	**−5%**

a Free on board. b Manufactured. c Includes explosives and pyrotechnic products; mineral tar and crude chemicals from coal, oil, and natural gas; and chemical materials and products not elsewhere specified. **Source:** Central Intelligence Agency, estimated from data reported by China's trade partners

CHEMICAL EXPORTS: Uptrend continues

$ Millions[a]	1981	1980	1979	Change 1980–81
Chemical elements and compounds	$ 554	$ 478	$273	16%
Organic chemicals	297	275	165	8
Medicinal products	190	184	113	3
Essential oils, perfume, and cleansing materials	91	98	78	−7
Explosives and pyrotechnic products	93	94	72	−1
Plastic materials, resins	61	73	48	−16
Dyeing, tanning, and coloring materials	63	58	44	9
Mineral tar and crude chemicals[b]	56	27	9	107
Fertilizers[c]	5	4	2	25
Other chemical products	189	165	124	15
TOTAL	**$1300**	**$1182**	**$763**	**10%**

a Free on board. b From coal, oil, and natural gas. c Manufactured. **Source:** Central Intelligence Agency, estimated from data reported by China's trade partners

TAIWAN

INDUSTRY TRENDS: Industrial chemicals down

Industrial production indexes, 1976 = 100	1982	1981	1980	1979	Change 1981–82
All manufacturing	172.4	169.3	163.2	153.0	2%
Chemical materials	208.2	205.1	201.2	189.1	2
Basic chemicals	131.7	152.5	150.2	148.5	−14
Petrochemicals	239.6	262.3	254.4	242.0	−9
Fertilizers	86.9	124.0	134.6	127.9	−30
Synthetic fibers	214.9	197.4	187.7	174.5	9
Plastics and resins	247.5	210.4	214.5	197.5	18
Chemical products	207.6	176.7	163.9	161.0	17

Source: Council for Economic Planning & Development, Taiwan

FOREIGN TRADE: Chemical deficit narrows

$ Millions	1982	1981	1980	1979
Exports[a]	$22,204	$22,611	$19,811	$16,103
Imports[b]	18,888	21,200	19,733	14,774
Trade balance	3,316	1,411	78	1,330
Chemical exports[a,c]	1,012	973	494	356
Chemical imports[b,c]	2,311	2,704	2,024	1,817
Chemical trade balance	−1,299	−1,731	−1,530	−1,461

a Free on board. b Includes cost, insurance, and freight. c Includes chemicals, chemical products, pharmaceuticals, chemical fertilizers, plastic materials, and synthetic resins. **Sources:** Council for Economic Planning & Development, Taiwan, C&EN estimates

PRODUCTION: Off sharply for several chemicals

Thousands of metric tons, unless otherwise noted	1982	1981	1980	1979	Change 1981–82
Fertilizers[a]	na	1921	2092	1979	na
Man-made fibers	730	687	633	587	6%
Polyvinyl chloride	459	456	454	407	1
Synthetic detergents	95	94	104	105	1
Benzene[b]	130	137	145	153	−5
Ethylene	452	443	458	445	2
Ethylene glycol	120	156	133	118	−23
Propylene	225	204	213	205	10
Toluene[b]	113	172	153	134	−34
Vinyl chloride	434	411	405	317	6
Xylene[b]	230	277	311	285	−17
Ammonia, anhydrous	386	494	504	476	−22
Ammonium sulfate	373	504	539	556	−26
Calcium superphosphate	160	226	207	208	−29
Hydrochloric acid	191	184	179	180	4
Oxygen[c]	156	174	159	141	−10
Sodium hydroxide	355	373	411	430	−5
Sulfuric acid	685	819	769	777	−16
Urea	175	285	343	312	−39

a In terms of 20% N, 18% P_2O_5, and 50% K_2O fertilizer. b Millions of liters. c Millions of cubic meters. na = not available. **Source:** Council for Economic Planning & Development, Taiwan